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MINERAL SUMMARIES

U.S. Bureau of Land Management
Wilderness Study Areas in
Nevada

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INTRODUCTION

The Branch of Western Mineral Resources, U.S. Geological Survey (Menlo Park CA) in cooperation with the Branch of Resource Evaluation, Bureau of Mines (Spokane, WA and Denver, CO) prepared this mineral "Briefing Book," that summarizes the mineral resource evaluations on 105 wilderness study areas in or administered from Nevada. These areas are lands administered by the U.S. Bureau of Land Management. All but two of these areas are classified as wilderness study areas; two exceptions are instant study areas. Interspersed throughout many of the federal lands are parcels of private and State land.

This volume for Nevada U.S. Bureau of Land Management wilderness study areas was prepared by the Branch of Western Mineral Resources, U.S. Geological Survey, in cooperation with the Branch of Resource Evaluation, U.S. Bureau of Mines.

This volume covers a total of 5,345,064 acres. The mineral resource information was requested under the Federal Land Policy and Management Act (Public Law 94-579, October 21, 1976), which required the U.S. Geological Survey and U.S. Bureau of Mines to conduct mineral surveys on all or part of 62 areas to determine the mineral values, if any, that may be present. The U.S. Bureau of Land Management requested studies of wilderness study areas in and administered from Nevada, that totaled 3,604,112 acres. These consist of 9 areas that total 225,427 acres and parts of 53 areas that total 3,378,685. This briefing book additionally contains information on 3,133,338 acres that consist of the 42 remaining study areas that total 1,740,952 acres and the unstudied parts of 53 areas that total 1,992,386 acres. However, the mineral information on the areas that were not studied is tenuous and based on literature searches and, where applicable, discussions with private industry. Table 1 is a list of the U.S. Bureau of Land Management wilderness study areas covered in this volume, along with their number, acreages, and whether they were studied by the U.S. Geological Survey and the U.S. Bureau of Mines

Format of Briefing Book

Each mineral summary in this book includes text describing the identified resources, mineral resource potential, mining activity, mineral setting, recommendations for further study and references. Each summary also has a map showing significant mines and prospects in and near the proposed wilderness, along with an indication of the potential for undiscovered resources. Identified resources and areas of high resource potential are shown in red; areas of moderate resource potential are shown in pink. Undiscovered resources are studied by the U.S. Geological Survey and identified mineral resources are studied by the U.S. Bureau of Mines .

Table 2 lists the study areas covered in this volume and shows those which have identified resources or areas of moderate or high mineral resource potential. Table 3 lists designated strategic and critical minerals and table 4 contains a list of mineral commodities in the wilderness study areas, their import reliance, major foreign sources, and principal uses. A geologic time chart is included in the back of this book for reference.

Classification of Mineral Resources

According to Memorandum of Understanding, the U.S. Bureau of Mines is responsible for studying the known, or identified resources, and the U.S. Geological Survey is responsible for studying unknown, or the undiscovered resources of a study area. The resource classification used by the U.S. Bureau of Mines and the mineral resource classification used by the U.S. Geological Survey are presented in figures 1 and 2.

List of Measurement Abbreviations Used in This Book

ft	foot
lb	pound
lb/ton	pound per ton
Ma	million years
mi	mile
si2	square mile
oz	troy ounce
oz/ton	troy ounce per ton
ppm	part per million
stu	short ton unit
yd2	square yard
yd3	cubic yard
%	percent

Other Abbreviations Used in This Book

BLM	U.S. Bureau of Land Management
MILS	U.S. Bureau of Mines Mineral Industry Location System
MRDS	U.S. Geological Survey Mineral Resources Data System
USBM	U.S. Bureau of Mines
USFS	U.S. Forest Service
USGS	U.S. Geological Survey

MINERAL SUMMARY FOR THE STATE OF NEVADA

The State of Nevada has an impressive mineral weatlth. Nevada's nonfuel mineral production in 1987 ranked third nationally. The $1.5 billion produced was an increase of $470 million or 48 percent from that recorded in 1986. Nevada led the nation in the production of barite, gold, mercury, and silver and was the sole producer of mined magnesite. Gold was the leading commodity produced in terms of value, accounting for $1.2 billion or more than 80 percent of the total nonfuel mineral value produced in the State. Nevada's gold production accounted for 54 percent of the total amount produced in the United States in 1987.

Industrial mineral production consisted of clays, diatomite, barite, gypsum, sand, gravel, salt, perlite, gem stone, fluorspar, lime, and crushed stone. Metal production included gold, silver, mercury, iron, barite, copper, lithium, and magnesite. (Data from U.S. Bureau of Mines Minerals Yearbook, 1987)

Many of the wilderness study areas in Nevada are near areas of mineral production; identified or known resources in the study areas are building stone, sand, gravel, limestone, dolomite, marble, basalt, cinders, pozzolan, mica, beryl, zeolites, perlite, opal, phosphate, gypsum, feldspar, silica, diatomite, gold, silver, lead, zinc, copper, tungsten, mercury, molybdenum, iron, cobalt, gallium, germanium, and geothermal energy. A total of 31 wilderness study areas have high potential for undiscovered resources of gold, silver, copper, lead, zinc, mercury, tungsten, molybdenum, selenium, vanadium, antimony, arsenic, lithium, limestone, clays, zeolites, perlite, calcium borates, oil, gas, and (or) geothermal energy. Seventy-one wilderness study areas have moderate potential for undiscovered resources of phosphate, gypsum, feldspar, mica, beryllium, pozzolan, fluorite, building stone, sand, gravel, opal, agate, zeolites, gold, silver, copper, lead, zinc, molybdenum, antimony, manganese, tungsten, tin, mercury, cobalt, iron, arsenic, bismuth, nickel, lithium, cadmium, uranium, thorium, niobium, rare earth elements, oil, gas, and (or) geothermal energy.

Table 1.--U.S. Bureau of Land Management wilderness study areas in Nevada, their numbers and acreages, and whether they were studied by the U.S. Geological Survey and the U.S. Bureau of Mines

Area Name	Number	Acres	Studied
Alder Creek	NV-020-600D	5,142	no
Antelope	NV-060-231/241	87,400	partially
Arrow Canyon Range	NV-050-215	32,853	no
Augusta Mountains	NV-030-108	89,372	no
Bad Lands	NV-010-184	9,426	partially
Black Rock Desert	NV-020-620	319,594	partially
Blue Eagle	NV-060-158/199	60,310	partially
Blue Lakes	NV-020-600	20,508	partially
Bluebell	NV-010-027	55,665	partially
Bonelli Peak	NV-050-238	3,000	no
Buffalo Hills	CA-020-619	47,315	no
Burbank Canyon	NV-030-525A	13,395	no
Calico Mountains	NV-020-019	67,647	no
Carson Iceberg	NV-030-532	550	yes
Cedar Ridge	NV-010-088	10,009	no
China Mountain	NV-020-406P	10,358	no
Clan Alpine Mountains	NV-030-102	196,128	partially
Clover Mountains	NV-050-139	84,935	partially
Cougar Canyon (Tunnel Spring)	UT-040-123/NV-050-166	15,968	partially
Delamar Mountains	NV-050-177	126,257	no
Desatoya Mountains	NV-030-110	51,262	partially
Disaster Peak	OR-003-153/NV-020-859	31,490	partially
Dry Valley Rim	CA-020-615	93,205	partially
East Fork High Rock Canyon	CA-020-914/NV-020-006A	52,000	partially
El Dorado	NV-050-423	12,596	partially
Evergreen	NV-050-1R-16A/B/C	2,834	no
Fandango	NV-060-190	40,940	partially
Far South Egans	NV-040-172	53,224	partially
Fish & Wildlife #1/2/3	NV-050-201/216/217	50,334	no
Five Springs	CA-020-609	48,460	no
Fortification Range	NV-040-177	41,615	no
Fox Mountain Range	NV-020-014	75,404	no
Gabbs Valley Range	NV-030-407	75,440	no
Garrott Buttes	NV-050-235	11,835	no
Goshute Canyon	NV-040-015	30,585	partially
Goshute Peak	NV-010-033	69,770	partially
Grapevine Mountains (Bonnie Clair Flat)	NV-060-355	69,000	no

Table 1.--Continued

Area Name	Number	Acres	Studied
High Rock Canyon	CA-020-913B	33,300	partially
High Rock Lake	NV-020-007	61,902	partially
Ireteba Peaks	NV-050-438	12,000	yes
Job Peak	NV-030-127	90,209	no
Jumbo Springs	NV-050-236	3,466	no
Kawich	NV-060-019	54,320	no
La Madre Mountains	NV-050-412	56,957	partially
Lime Canyon	NV-050-231	30,747	yes
Little High Rock Canyon (Yellow Rock Canyon)	CA-020-913/NV-020-008	52,143	partially
Little Humboldt River	NV-010-132	42,213	partially
Marble Canyon (Granite Springs)	NV-040-086	23,327	partially
Massacre Rim	CA-020-1013	110,000	partially
Meadow Valley Range	NV-050-156	185,744	partially
Million Hills	NV-050-233	11,523	partially
Morey	NV-060-191	20,120	partially
Mormon Mountains	NV-050-161	162,887	partially
Mount Grafton	NV-040-169	73,216	partially
Mount Limbo	NV-020-201	23,702	partially
Mount Stirling	NV-050-401	69,650	partially
Muddy Mountains	NV-050-229	96,170	yes
Nellis	NV-050-4R-15	5,718	no
North Black Rock	NV-020-622	30,791	no
North Fork Little Humboldt River	NV-020-827	69,683	partially
North Jackson Mountains	NV-020-606	26,457	no
North McCullough Mountains	NV-050-425	46,166	no
Owyhee Canyon	NV-010-106	21,875	partially
Pahute Peak	NV-020-621	57,529	partially
Palisade Mesa	NV-060-142/162	99,550	partially
Park Range	NV-040-154	47,268	partially
Parsnip Peak	NV-040-206	88,107	partially
Pigeon Spring	NV-050-350	3,575	no
Pine Creek	NV-050-414/NV-000-ISA2	24,000	yes
Pole Creek	NV-020-014A	12,969	no
Poodle Mountain	NV-020-012	142,050	no
Pueblo Mountains	NV-020-642/OR-002-081	69,310	partially
Quail Springs	NV-050-411	12,145	no
Queer Mountain	NV-060-354	81,550	no
Rawhide Mountain	NV-060-059	64,360	no
Red Spring	NV-010-091	7,847	no

Table 1.--Continued

Area Name	Number	Acres	Studied
Resting Springs Range	NV-050-460	3,850	no
Riordan's Well	NV-040-166	57,002	partially
Roberts	NV-060-541	15,090	yes
Rough Hills	NV-010-151	6,685	yes
Selenite Mountain	NV-020-200	32,041	no
Sheldon Contiguous	CA-020-1012	24,130	partially
Silver Peak Range	NV-060-338	33,900	partially
Simpson Park	NV-060-428	49,670	no
Skedaddle	CA-020-612	60,960	partially
Slinkard	CA-010-105/NV-030-531	6,350	no
South Egan Range	NV-040-168	96,916	no
South Fork Owyhee River	NV-010-103A	7,842	partially
South Jackson Mountains	NV-020-603	60,211	partially
South McCullough Mountains	NV-050-435	56,623	partially
South Pahroc Range	NV-050-132	28,600	partially
South Pequop	NV-010-035	41,090	partially
South Reveille	NV-060-112	106,200	partially
Stillwater Range	NV-030-104	94,607	no
Table Mountain	NV-040-197	35,958	no
The Wall	NV-060-163	38,000	partially
Tobin Range	NV-020-406Q	13,107	no
Tunnel Spring (Cougar Canyon)	NV-050-166/UT-060-123	15,968	partially
Twin Peaks	CA-020-619A	90,345	partially
Virgin Mountain	NV-000-ISA	16,560	yes
Wall Canyon	CA-020-805	45,790	no
Weepah Spring	NV-040-246	61,137	partially
White Rock Range	NV-040-202/UT-040-216	23,625	yes
Worthington Mountains	NV-040-242	47,633	partially
Yellow Rock Canyon (Little High Rock Canyon)	NV-020-008/CA 020-913	52,143	partially

Table 2.--U.S. Bureau of Land Management wilderness study areas in Nevada with identified resources (known) or with high or moderate mineral resource potential (undiscovered)

Wilderness Study Area	Number	Identified Resources (known)	Mineral Resource Potential (undiscovered)	
			High	Moderate
Alder Creek	NV-020-600D	none		
Antelope	NV-060-231/241	none	silver, molybdenum, zinc, selenium, vanadium	gold, silver
Arrow Canyon Range	NV-050-215	none		oil, gas, silica, clay, gypsum, diatomite, limestone, sand, gravel
Augusta Mountains	NV-030-108	none		gold, mercury, manganese, geothermal
Bad Lands	NV-010-184	none		
Black Rock Desert	NV-020-620	none		gold, silver, mercury, lithium, geothermal
Blue Eagle	NV-060-158/199	none	oil, gas	gold, silver, molybdenum, copper, lead, zinc, antimony
Blue Lakes	NV-020-600	none		
Bluebell	NV-010-027	gold, limestone	gold, limestone	gold, phosphates
Bonelli Peak	NV-050-238	none		gold, silver, copper, lead, zinc, beryllium, feldspar, mica
Buffalo Hills	CA-020-619	none		gold, silver, copper, lead, zinc, clay, zeolites, pozzolan
Burbank Canyon	NV-030-525A	none	gold, silver, lead, zinc, tungsten, copper, molybdenum	
Calico Mountains	NV-020-019	none		gold, silver, geothermal
Carson Iceberg	NV-030-532	none		
Cedar Ridge	NV-010-088	none		oil and gas
China Mountain	NV-020-406P	none		
Clan Alpine Mountains	NV-030-102	none	gold, silver	gold, silver, molybdenum, antimony
Clover Mountains	NV-050-139	none	molybdenum	
Cougar Canyon (Tunnel Spring)	UT-040-123/NV-050-166	none		
Delamar Mountains	NV-050-177	none		
Desatoya Mountains	NV-030-110	none		gold, silver
Disaster Peak	OR-003-153/NV-020-859	none	gold	
Dry Valley Rim	CA-020-615	zeolites, perlite		zeolites
East Fork High Rock Canyon	CA-020-914/NV-020-006A	none		gold, silver, mercury, zeolites
El Dorado	NV-050-423	gold, silver, lead, zinc, sand, gravel	gold, silver, copper, lead, zinc, mercury	gold, silver, copper, lead, zinc, mercury

Table 2.--Continued

Wilderness Study Area	Number	Identified Resources (known)	Mineral Resource Potential (undiscovered)	
			High	Moderate
Evergreen	NV-050-1R-16A/B/C	none		
Fandango	NV-060-190	silver, lead, zinc	gold	silver, lead, zinc
Far South Egans	NV-040-172	limestone, silica, sand, gravel		gold, molybdenum, cadmium, lead, zinc
Fish & Wildlife #1/2/3	NV-050-201/216/217	sand, gravel		oil, gas
Five Springs	CA-020-609	clay	clay	
Fortification Range	NV-040-177	none		
Fox Mountain Range	NV-020-014	none		gold, silver, tungsten
Gabbs Valley Range	NV-030-407	manganese		gold, silver, manganese, mercury, antimony
Garrott Buttes	NV-050-235	none		gold, beryllium
Goshute Canyon	NV-040-015	none		gold, silver, antimony, copper, lead, zinc, tungsten
Goshute Peak	NV-010-033	limestone	limestone	
Grapevine Mountains (Bonnie Clair Flat)	NV-060-355	none		gold
High Rock Canyon	CA-020-913B	none	zeolites	gold, silver, mercury
High Rock Lake	NV-020-007	geothermal		
Ireteba Peaks	NV-050-438	gold, silver, copper		gold, silver, copper, lead, zinc
Job Peak	NV-030-127	none		gold, silver
Jumbo Springs	NV-050-236	none		gold, lead, zinc, beryllium
Kawich	NV-060-019	none		gold, silver
La Madre Mountains	NV-050-412	none		
Lime Canyon	NV-050-231	gypsum, limestone, dolomite, sand, gravel		
Little High Rock Canyon (Yellow Rock Canyon)	CA-020-913/NV-020-008	none		gold, silver
Little Humboldt River	NV-010-132	none	gold, zeolites	gold, zeolites
Marble Canyon	NV-040-086	limestone, marble	limestone, marble	marble, barite
Massacre Rim	CA-020-1013	none		gold, silver, mercury, uranium
Meadow Valley Range	NV-050-156	perlite, zeolites, sand, gravel, stone, silica, limestone	vanadium, perlite, limestone, sand, gravel	tin, zeolite, agate, marekanite, opal
Million Hills	NV-050-233	gold, silver, copper, lead, zinc, cobalt, gallium, germanium		gold, silver, copper, cobalt, lead, zinc, uranium, thorium, rare earth elements
Morey	NV-060-191	silver, lead, zinc	silver, lead, zinc	silver, lead, zinc
Mormon Mountains	NV-050-161	none	gold, silver, copper, lead, zinc, arsenic, antimony	tungsten, molybdenum, tin, antimony, oil, gas

Table 2.--Continued

Wilderness Study Area	Number	Identified Resources (known)	Mineral Resource Potential (undiscovered)	
			High	Moderate
Mount Grafton	NV-040-169	tungsten, zinc	tungsten, copper, zinc	gold, silver, lead, tungsten, zinc, fluorite
Mount Limbo	NV-020-201	none		gold, silver
Mount Stirling	NV-050-401	none	gold	gold
Muddy Mountains	NV-050-229	zeolites, clay	calcium borates, lithium	building stone, silica
Nellis	NV-050-4R-15	none		gold, silver, lead, zinc, oil, gas
North Black Rock	NV-020-622	none		geothermal
North Fork Little Humboldt River	NV-020-827	none		
North Jackson Mountains	NV-020-606	iron, sand, gravel		gold, silver, copper, lead, zinc, iron
North McCullough Mountains	NV-050-425	none		
Owyhee Canyon	NV-010-106	none		
Pahute Peak	NV-020-621	none	gold, silver, geothermal	gold, silver, copper, lead, zinc, molybdenum, tungsten
Palisade Mesa	NV-060-142/162	cinders		
Park Range	NV-040-154	none		gold, silver, mercury, arsenic
Parsnip Peak	NV-040-206	perlite	gold, mercury, arsenic, antimony	perlite
Pigeon Spring	NV-050-350	none		gold
Pine Creek	NV-050-414/NV-000-ISA2	none		
Pole Creek	NV-020-014A	none		gold, silver, lead
Poodle Mountain	NV-020-012	none		
Pueblo Mountains	NV-020-642/OR-002-081	gold, copper, molybdenum, zeolites, diatomite, geothermal, sand, gravel, stone	silver, mercury	gold, silver, mercury, copper, molybdenum
Quail Springs	NV-050-411	none		sand, gravel
Queer Mountain	NV-060-354	none		gold
Rawhide Mountain	NV-060-059	none		silver, lead, zinc
Red Spring	NV-010-091	none		oil, gas
Resting Springs Range	NV-050-460	none	clay	geothermal
Riordan's Well	NV-040-166	none	oil, gas	gold, silver, copper, lead, zinc, molybdenum, bismuth
Roberts	NV-060-541	none	gold, silver	gold, silver
Rough Hills	NV-010-151	gold		

Table 2.--Continued

Wilderness Study Area	Number	Identified Resources (known)	Mineral Resource Potential (undiscovered)	
			High	Moderate
Selenite Mountain	NV-020-200	none		geothermal
Sheldon Contiguous	CA-020-1012	none		
Silver Peak Range	NV-060-338	none	gold, silver	gold, silver
Simpson Park	NV-060-428	none		
Skedaddle	CA-202-612	perlite	gold, silver, mercury, antimony	gold, silver, mercury, antimony, perlite, geothermal
Slinkard	CA-010-105/NV-030-531	none		
South Egan Range	NV-040-168	none	tungsten, copper, zinc	gold, silver, lead, zinc, molybdenum, cadmium, fluorite
South Fork Owyhee River	NV-010-103A	opal, gold, sand, gravel, building stone		
South Jackson Mountains	NV-020-603	none		gold, silver, copper, lead, zinc, iron
South McCullough Mountains	NV-050-435	none		gold, silver, lead, copper, zinc, uranium, thorium, niobium, rare earth elements
South Pahroc Range	NV-050-132	perlite		gold
South Pequop	NV-010-035	phosphate		gold, silver, lead, zinc, copper, phosphate
South Reveille	NV-060-112	none		gold, silver
Stillwater Range	NV-030-104	none	gold	gold, silver, copper, tungsten
Table Mountain	NV-040-197	none		gold, silver, uranium
The Wall	NV-060-163	basalt, cinders		
Tobin Range	NV-020-406Q	mercury, sand, gravel		
Tunnel Spring (Cougar Canyon)	NV-050-166/UT-060-123	none		
Twin Peaks	CA-020-619A	pozzolan		gold
Virgin Mountain	NV-000-ISA	tungsten, feldspar, gypsum, limestone, mica, beryl		gold, silver, tungsten, copper, nickel, gypsum, feldspar, mica, beryllium
Wall Canyon	CA-020-805	none		gold, silver, mercury, uranium, lithium, zeolites, clay, pozzolan
Weepah Spring	NV-040-246	silver	gold, mercury	gold, silver, copper, lead, zinc
White Rock Range	NV-040-202/UT-040-216	none		
Worthington Mountains	NV-040-242	silver, lead, zinc, copper		gold, silver, copper, lead, zinc, tungsten
Yellow Rock Canyon (Little High Rock Canyon)	NV-020-008/CA-020-913	none		gold, silver

Table 3.--Mineral Commodities designated strategic and critical

1. Aluminum/Bauxite
2. Antimony
3. Asbestos
4. Beryllium/Beryl
5. Bismuth
6. Cadmium
7. Chromium/Chromite
8. Cobalt
9. Columbium (Niobium)
10. Copper
11. Diamond
12. Flourspar
13. Germanium
14. Graphite
15. Lead
16. Manganese
17. Mercury
18. Mica
19. Molybdenum
20. Nickel
21. Platinum (iridium, platinum, palladium)
22. Quartz crystals
23. Rutile
24. Sapphire/Ruby (Corundum)
25. Silver
26. Talc
27. Tantalum
28. Thorium
29. Tin
30. Tungsten
31. Vanadium
32. Zinc

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*Indicates commodities that are identified or have moderate or high mineral resource potential in wilderness study ares in Nevada.

Table 4.--Percent of U.S. consumption from imports, major foreign sources, and principal uses for mineral commodities identified in Nevada wilderness study areas.

	Metals and Minerals	Major Foreign Sources	Principal Uses
Net Exports			
	Boron	Turkey, Italy, Argentina	Glass products (59%), soap and detergents (7%)
	Clays	United Kingdom, Mexico, Canada	Paper, refactories, pottery, title fire bricks, foundry sand, drilling mud, absorbent uses, construction materials
	Diatomite	Taiwan, Mexico	Filter aid (67%), fillers (17%)
	Feldspar	Mexico, Venezuela	Glass (54%), pottery (46%)
	Garnet	Australia	Transport manufacturing (50$), filtration media (30%), wood furniture finishing (10%), electronic components (7%)
	Lithium	Chile, Zimbabwe, Canada	Ceramics and glass (40%), aluminum products and lubricants (45%)
	Magnesium (dolomite)	Canada, Norway	Aluminum-base alloys (53%), magnesium castings (23%)
	Molybdenum	Canada, Mexico, Chile Federal Republic of Germany	Machinery (30%), oil and gas industry (15%), transportation (15%), chemical (15%), electrical (15%)
	Phosphate Rock	Morocco, Republic of Togo, Netherlands, Antilles	Fertilizer (92%), chemicals (8%)
	Rare-earth metals and yttrium	Monazite: Australia, Malaysia	Petroleum catalysts (36%), metallurgical uses (31%), ceramic and glass (29%)
	Sand and gravel	Canada, Australia, Antigua	Construction sand and gravel: concrete aggregate (28%), road base (15%), asphalt (10%) Industrial sand and gravel: glass (40%), foundry (21%), abrasive (7%)

Table 4.--Continued

Metals and Minerals	Major Foreign Sources	Principal Uses
Sodium carbonate (soda ash)	Canada	Glass (53%), chemicals (20%), soap and detergents (10%)
Talc and pyrophyllite	Canada, Italy, France	Talc: ceramics (35%), paints (17%), paper (13%), roofing (11%), pyrophyllite: ceramics (55%), refractories (17%), insecticides (11%)
0-25 Percent Net Import Reliance		
Beryllium	China, Brazil, Republic of South Africa, Switzerland	Alloy and oxides in electrical equipment and components (56%), nuclear reactors and aerospace (22%)
Cement	Canada, Mexico, Spain	Ready-mix concrete (72%), concrete products (12%)
Copper	Chile, Canada, Peru	Construction (42%), electrical and electronic (24%)
Metals and Minerals	Major Foreign Sources	Principal Uses
Gold	Canada, Switzerland (mostly) Republic of South Africa origin), Uruguay	Jewelry and arts (59%), electronic (33%), dental (8%)
Lead (metal)	Canada, Mexico, Australia, Peru	Transportation with 70% in batteries and gasoline additives
Perlite	Greece	Building construction (70%), filter aid (12%)
Salt	Canada, Mexico, Bahamas	Chemical industry (47%), highway de-icing (26%)
Stone (crushed)		Construction aggregate (63), cement and lime (11%); of the crushed stone, 72% was limestone-dolomite; 15% granite
Titanium (metal)	Japan, USSR	Aircraft and aerospace (75%)

Table 4.--Continued

Metals and Minerals	Major Foreign Sources	Principal Uses
26-50 Percent Net Import Reliance		
Gypsum	Canada, Mexico, Spain	Industrial and building plaster (77%), cement and agriculture (20%)
Iron ore	Canada, Venezuela, Liberia, Brazil	Blast furnaces (97.6%), steel furnaces (0.3%)
Pumice and pumicite	Greece	Concrete aggregate and building block (90%)
Selenium	Canada, United Kingdom, Japan, Belgium	Electronic and photo copiers (35%), chemical (28%), glass (25%)
Stone (dimension)	Italy, Canada, Spain	Building construction (47%), monuments (26%), rubble (14%); of the total, 55% was granite, 25% limestone, 11% sandstone
51-90 Percent Net Import Reliance		
Asbestos	Canada, Republic of South Africa	Friction products (22%), roofing products (17%), asbestos-cement pipe (17%), coatings and compounds (15%)
Barite	China, Morocco, India	Weighting agent in drilling muds (65%), paints and rubber
Cadmium	Canada, Australia, Mexico Federal Republic of Germany	Coating and plating (30%), batteries (30%), pigments (20%)
Chromium	Republic of South Africa, Turkey, Zimbabwe, Yugoslavia	Chemical and metalurgical industry (90%), refractory industry (10%)
Fluorspar	Mexico, Republic of South Africa	Hydrofluoric acid (70%), steelmaking (25%)
Nickel	Canada, Australia, Norway, Botswana	Stainless and alloy steel (39%), nonferrous alloys (28%), electroplating (22%)
Platinum-group metals	Republic of South Africa, United Kingdom, USSR	Automotive (42%), electrical and electronic (20%), dental and medical (20%)
Potash	Canada, Israel	Fertilizer (95%), chemical industry (5%)

Table 4.--Continued

Metals and Minerals	Major Foreign Sources	Principal Uses
Silver	Canada, Mexico, Peru, United Kingdom	Photography (45%), electrical and electronic (26%), electroplating and jewelry (13%)
Tin	Thailand, Brazil, Indonesia, Bolivia	Electrical (20%), cans and containers (17%) construction (16%), transportation (14%)
Tungsten	Canada, China, Bolivia	Metalworking (76%), lamps and lighting (11%), electrified machinery (10%), transportation (9%)
Zinc	Canada, Peru, Mexico, Honduras	Construction materials (50%), transportations (23%), machinery (12%), electrical (10%)
Greater Than 91 Percent Net Import Reliance		
Bauxite and alumina	Jamaica, Guinea, Suriname, Australia	Bauxite processed into alumina (89%)
Graphite	Mexico, China, Brazil, Madagascar	Refractories (25%), lubricants (15%) foundry (14%), brake linings (13%)
Manganese	Republic of South Africa, Gabon, Australia, Brazil, France	Manganese ferroalloys, dry cell batteries, chemicals
Quartz crystal	Brazil	Piezoelectric filter devices and oscillators
Strontium	Mexico, Spain	Television tube glass (58%), pyrotechnics (15%)
Tantalum	Thailand, Australia, Brazil	Electronic components (59%), machinery (19%), transportation (15%)
Thallium	Belgium, Netherlands, United Kingdom, Federal Republic of Germany	Electronics (70%)
Net Import Data Withheld		
Antimony	Bolivia, China, Mexico, Republic of South Africa, France	Flame retardants (65%), batteries (10%) chemicals (10%), ceramics and glass (5%)
Bismuth	Peru, Mexico, United Kingdom, Belgium	Pharmaceuticals (50%), machinery (22%), primary metals (26%)

Table 4.--Continued

Metals and Minerals	Major Foreign Sources	Principal Uses
Mercury	Spain, Algeria, Turkey,	Electrical (51%), chlorine productions (19%), paints (11%)
Tellurium	Canada, Philippines, United Kingdom	Iron and Steel production (60%), nonferrous metals (25%), chemicals (10%)
Thorium	France, Netherlands, Canada, Australia, United Kingdom	Nuclear fuel, incandescent lamp mantles, alloys, refractories, ceramics, welding electrodes
Vanadium	Republic of South Africa, European Communities, Canada	Alloying agent for iron and steel
Zirconium	Australia, Republic of South Africa, France	Foundry sand (35%), refractories (30%) ceramics (20%), abrasives (5%)
Minerals not listed in Mineral Commodity Summaries		
Uranium		Nuclear energy
Wollastonite		Paints, plastic, and tile
Zeolite		Filter-aid, absorbents

Source: Adapted from U.S. Bureau of Mines, Mineral Commodity Summaries, 1987, 193 p.

RESOURCE/RESERVE CLASSIFICATION

	IDENTIFIED RESOURCES			UNDISCOVERED RESOURCES	
	Demonstrated		Inferred	Probability Range	
	Measured	Indicated		Hypothetical	Speculative
ECONOMIC	Reserves		Inferred Reserves		
MARGINALLY ECONOMIC	Marginal Reserves		Inferred Marginal Reserves		
SUB-ECONOMIC	Demonstrated Subeconomic Resources		Inferred Subeconomic Resources		

Major elements of mineral resource classification, excluding reserve base and inferred reserve base. Modified from McKelvey, V.E., 1972, Mineral resource estimates and public policy: American Scientist, v. 60, p. 32-40; and U.S. Bureau of Mines and U.S. Geological Survey, 1980, Principles of a resource/reserve classification for minerals: U.S. Geological Survey Circular 831, p. 5.

Figure 1.--Resource/reserve classification.

DEFINITION OF LEVELS OF MINERAL RESOURCE POTENTIAL AND CERTAINTY OF ASSESSMENT

LEVELS OF RESOURCE POTENTIAL

H **HIGH** mineral resource potential is assigned to areas where geologic, geochemical, and geophysical characteristics indicate a geologic environment favorable for resource occurrence, where interpretations of data indicate a high degree of likelihood for resource accumulation, where data support mineral-deposit models indicating presence of resources, and where evidence indicates that mineral concentration has taken place. Assignment of high resource potential to an area requires some positive knowledge that mineral-forming processes have been active in at least part of the area.

M MODERATE mineral resource potential is assigned to areas where geologic, geochemical, and geophysical characteristics indicate a geologic environment favorable for resource occurrence, where interpretations of data indicate reasonable likelihood for resource accumulation, and (or) where an application of mineral-deposit models indicates favorable ground for the specified type(s) of deposits.

L LOW mineral resource potential is assigned to areas where geologic, geochemical, and geophysical characteristics define a geologic environment in which the existence of resources is permissive. This broad category embraces areas with dispersed but insignificantly mineralized rock, as well as areas with little or no indication of having been mineralized.

N NO mineral resource potential is a category reserved for a specific type of resource in a well-defined area.

U UNKNOWN mineral resource potential is assigned to areas where information is inadequate to assign a low, moderate, or high level of resource potential.

LEVELS OF CERTAINTY

A Available information is not adequate for determination of the level of mineral resource potential.
B Available information only suggests the level of mineral resource potential.
C Available information gives a good indication of the level of mineral resource potential.
D Available information clearly defines the level of mineral resource potential.

LEVEL OF RESOURCE POTENTIAL →

A	B	C	D
U/A UNKNOWN POTENTIAL	H/B HIGH POTENTIAL	H/C HIGH POTENTIAL	H/D HIGH POTENTIAL
	M/B MODERATE POTENTIAL	M/C MODERATE POTENTIAL	M/D MODERATE POTENTIAL
	L/B LOW POTENTIAL	L/C LOW POTENTIAL	L/D LOW POTENTIAL
			N/D NO POTENTIAL

LEVEL OF CERTAINTY →

Abstracted with minor modifications from:

Taylor, R.B., and Steven, T.A., 1983, Definition of mineral resource potential: Economic Geology, v. 78, no. 6, p. 1268-1270.
Taylor, R.B., Stoneman, R.J., and Marsh, S.P., 1984, An assessment of the mineral resource potential of the San Isabel National Forest, south-central Colorado: U.S. Geological Survey Bulletin 1638, p. 40-42.
Goudarzi, G.H., compiler, 1984, Guide to preparation of mineral survey reports on public lands: U.S. Geological Survey Open-File Report 84-0787, p. 7, 8.

Figure 2.--Definition of levels of mineral resource potential and certainty of classification.

Wilderness Study Areas

(in alphabetical order)

Name:	Alder Creek
Area number:	NV-020-600D
Size (acres):	5,142
Status of mineral surveys:	This area was not studied by the U.S. Geological Survey or the U.S. Bureau of Mines.
Identified mineral resources (known):	No mineral resources have been identified in the Wilderness Study Area.
Mineral resource potential (undiscovered):	The study area has low potential for undiscovered mineral resources of gold and silver in epithermal veins with associated antimony, copper, lead, mercury, molybdenum, zinc, and uranium. The eastern part of the study area has low potential for undiscovered mineral resources of tungsten in skarn deposits.
Mining activity:	The Warm Springs mining district is about seven miles north of the wilderness study area and has produced 22,870 troy ounces of gold. The Varyville mining district, about six miles south of the wilderness study area, has produced 1,704 troy ounces of gold. The Leonard Creek mining district is about three miles southeast of the study area and is credited with 1,176 troy ounces of gold production, mostly placer, by the U.S. Bureau of Mines. The Pine Forest (Boyd Basin) mining district abuts the north boundary of the WSA; U.S. Bureau of Mines records show production of 1,305 troy ounces of gold and 418 troy ounces of silver here. July 1989 BLM records show 49 lode and 2 placer claims active in or adjacent to the WSA.
Geology:	The study area is underlain by late Paleozoic and early Mesozoic sedimentary rocks that were metamorphosed, folded, and faulted prior to emplacement of Mesozoic granitic plutons. In parts of the study area, Tertiary lavas and tuffs unconformably overly the granitic and metamorphic rocks.
Recommendations:	Additional sampling is needed to more clearly define mineralized and anomalous zones and trends. The wilderness study area should be studied as part of a comprehensive mineral survey by the Bureau of Mines and Geological Survey.
References:	Bennett, R.E., 1973, Mineral resources of the Blue Lake proposed primitive area, Humboldt County, Nevada: U.S.Bureau of Land Management Open-File Mineral Report, 29 p.

Bergquist, J.R., Plouff, Donald, Turrin, B.D., Smith, J.G., Turner, R.L., and Willett, S.L., 1987, Mineral resources of the Blue Lakes Wilderness Study Area, Humboldt County, Nevada: U.S. Geological Survey Bulletin 1726-D, 18 p.

Conners, R.A., Robinson, M.L., Bukofski, J.F., Meyer, W.T., and Howarth, R.J., 1982, Geochemical and geostatistical evaluation of wilderness study areas, Winnemucca District, northwestern Nevada: Golden, Colorado, Barringer Resources, Incorporated for U.S. Bureau of Land Management contract Open-File Report, v. 1-5, 2 plates.

Hill, J.M., 1912, The mining districts of the western United States: U.S. Geological Survey Bulletin 507, 309 p.

Johnson, M.G., 1973, Placer gold deposits of Nevada: U.S. Geological Survey Bulletin 1356, 118 p.

Lawrence, E. F., 1962, Antimony occurrences in Nevada: Nevada Bureau of Mines Map 2, scale 1:1,000,000.

Smith, J.G., 1973, Geologic map of the Duffer Peak Quadrangle, Humboldt County, Nevada: U.S. Geological Survey Miscellaneous Geologic Investigations Map I-606, scale 1:48,000.

Vanderburg, W.O., 1938, Reconnaissance of mining districts in Humboldt County, Nevada: U.S. Bureau of Mines Information Circular 6995, 54 p.

Wilden, Ronald, 1964, Geology and mineral resources of Humboldt County, Nevada: Nevada Bureau of Mines and Geology Bulletin 59, 154 p.

Willett, S.L., 1986, Mineral resources of the Blue Lakes and Alder Creek Wilderness Study Areas, Humboldt County, Nevada: U.S. Bureau of Mines Open-File Report MLA 33-86, 21 p.

EXPLANATION

Mineral resources of the Alder Creek Wilderness Study Area.

Name:	Antelope
Area number:	NV-060-231/241
Size (acres):	87,400 of which 83,100 were studied at the request of the U.S. Bureau of Land Management.
Status of mineral surveys:	Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Hardyman and others, 1987).
Identified mineral resources (known):	No mineral resources have been identified in the Wilderness Study Area. However, three areas contain anomalous gold values (Limestone Spring, Red Spring, and Big Cow Canyon).
Mineral resource potential (undiscovered):	The southern part of the area has moderate mineral resource potential for undiscovered gold and silver, and the Woodruff Formation in the southern part of the area has high resource potential for undiscovered vanadium, zinc, selenium, molybdenum and silver (fig.1). The remainder of the study area has low resource potential for undiscovered gold, silver, lead, zinc, manganese, tin, and molybdenum. The study area also has low resource potential for undiscovered oil and gas resources. Most of the study area consists of rugged mountainous terrain having approximately 2,600 ft (feet) of relief. The mountain range is a block tilted gently to the east and bounded on both sides by normal faults that dip steeply to moderately west and have major displacements.
Mining Activity:	The Morey mining district, located about 5 mi southeast of the WSA produced less than $1 million in silver, gold and lead. Unrecorded amounts of gold, silver, and barite have been produced from the Segura Ranch Area district north of the WSA. No production from within the WSA is known. The Fandango gold deposit is on a claim block which extends into the southern part of the WSA. Exploration on this deposit by Long Lac Mineral Exploration, Inc. and other nearby areas by Amselco Exploration, Inc., Canyon Resources, and Blue Sky Oil and Gas are reported within the past 3 years. July 1989 BLM records show 10 lode claims active in the WSA. Also, there were 3 oil and gas leases active in 1987 encompassing 8,200 acres.

Geology: Most of the study area consists of rugged mountainous terrain having approximately 2,600 ft (feet) of relief. The mountain range is a block tilted gently to the east and bounded on both sides by normal faults that dip steeply to moderately west and have major displacements. Most of the study area is underlain by a thick sequence of Tertiary volcanic rocks that predominantly consist of silicic ash-flow tuff, the Windous Butte Formation. Paleozoic and lower Mesozoic (see geologic time chart in appendix) marine sediments occur along the southern margin of the study area, and lower Paleozoic rocks are exposed in the northeast corner.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 4,300 acres that constitute the balance.

References:

Hardyman, R. F., Poole, F. G., Kleinhampl, F. J., Turner, R. L., Plouff, Donald, Duval, J. S., Johnson, F. L., and Benjamin, D. A., 1987, Mineral resources of the Antelope Wilderness Study Area, Nye County, Nevada: U.S. Geological Survey Bulletin 1731-E, 19 p.

Johnson, F. L., and Benjamin, D. A., 1986, Mineral resources of the Antelope Wilderness Study Area, Nye County, Nevada: U.S. Bureau of Mines Open File Report MLA 14-86, 16 p.

Longwell, C. R., Pampeyan, E. H., Bowyer, Ben, and Roberts, R. J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines Bulletin 62, 218 p.

Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas; Mineral potential handbook: Nevada Mining Association, Reno, NV, unnumbered pages.

EXPLANATION

Mineral resources of the Antelope Wilderness Study Area.

Name: Arrow Canyon Range
Area number: NV-050-215
Size (acres): 32,853

Status of mineral surveys: This area was not studied by the U.S. Geological Survey or the U.S. Bureau of Mines.

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): Oil and gas leases were held on parts of the study area in 1988 by a major oil company and several smaller companies (Nevada Mining Association, 1988). Sandberg (1983) shows the vicinity of the study area as having moderate potential for oil and gas. Silica sand has been quarried near the boundary of the study area, and there is moderate potential for additional non-metallic resources in the study area, including: silica sand, clay (montmorillonite), gypsum, diatomite, carbonate rock, and sand and gravel. There is no evidence of metallic mineralization in the area.

Mining activity: In the 1930's, more than 500,000 tons of high-calcium limestone were being produced annually from the Crystal Pass Member of the Sultan Limestone (Longwell and others, 1965, p. 205) near the study area. High-calcium limestone and lime are currently being produced at Apex, about fifteen miles south of the study area. Plans for expansion to the north (Dr. Star Curtis, telephone conversation, 1989) would bring the limestone mining near the south boundary of the study area.

Small amounts of bentonite have been mined for pharmaceuticals and diatomaceous beds have been mined for building stone in the Muddy Creek Formation in the vicinity of the north part of the study area (Longwell and others, 1965). Eureka Quartzite, mined along the west side of the study area, is crushed and sold as decorative stone(?) (Great Basin GEM Joint Venture).

Sand and gravel material sites have been designated in the vicinity by the U.S. Bureau of Land Management (Great Basin GEM Joint Venture, 1983), one adjacent to the north tip of the study area; four sand and gravel pits along Highway 93, west of the study area, are shown on topographic maps.

Numerous mining claims in and adjacent to the WSA, including the Tiffany claim (patented) have been staked, many for industrial minerals. July 1989 BLM records show seven lode mining claim locations active in the WSA.

The whole study area was covered by federal oil and gas leases in 1983 (Great Basin GEM Joint Venture, 1983). Small, uneconomic amounts of oil and gas have been found in the region (Longwell and others, 1965. p. 206, 207). Warm and hot springs occur about two miles east of the study area.

Geology: The geology of the area consists of a section of Cambrian through Permian sedimentary strata--a nearly complete section of Paleozoic rocks. The most abundant rock types in the area are limestones and dolimites Other stratified sedimentary rocks consist of quartzite, sandstone, siltstone, and shale. Overlying the Paleozoic rocks is a Tertiary sequence of tuffaceous sedimentary rocks and tuff. The area has been broken by both normal and low-angle thrust faults.

Recommendations: The wilderness study area should be studied as part of a comprehensive mineral survey by the Bureau of Mines and Geological Survey.

References:

Aero Service Division, 1979, Airborne Gamma-Ray Spectrometer and magnetometer survey, Las Vegas Quadrangle (Arizona, California, Nevada), Williams Quadrangle (Arizona), Prescott Quadrangle (Arizona), and Kingman Quadrangle (Arizona, California, Nevada), Final Report, volumes I and II: Houston, Tex., Western Geophysical Company of America, for U.S. Department of Energy, Open-File report GJBX 59(79).

Bowyer, Ben, Pampeyan, E. H., and Longwell, C. R., 1958, Geologic map of Clark County, Nevada: U.S. Geological Survey Miscellaneous Field Investigations Map MF-138, scale 1:200,000.

Cook, J.R., and Fay, W.M., 1982, Data report: western United States, National Uranium Resource Evaluation Program, hydrogeochemical and stream sediment reconnaissance: Aiken, SC, E.I. du Pont de Nemours and Company, Savannah River Laboratory, for U.S. Department of Energy, Open-File report GJBX 132(82), 33 p.

Great Basin GEM Joint Venture, 1983, Arrow Canyon/Las Vegas Range G-E-M Resources Area (GRA NO. NV-29) Technical Report (WSA's NV 050-0215, 050-0216, and 050-0217): Reno, Nevada, Great Basin GEM Joint Venture, Open-File report for U.S. Bureau of Land Management, 34 p.

Longwell, C.R., Pampeyan, E.H., Bowyer, Ben, and Roberts, R.J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines Bulletin 62, 218 p.

Murphy, T.D., 1954, Silica resources of Clark County, Nevada: Nevada Bureau of Mines Bulletin 55, 33p.

Nevada Mining Association, 1988, Nevada BLM wilderness study areas mineral potential handbook: Nevada Mining Association, One East First Street, Reno, NV.

Qualheim, B.J., 1978, Hydrogeochemical and stream sediment reconnaissance basic data report for Las Vegas NTMS Quadrangle, Arizona, California, and Nevada: Livermore, CA, Lawrence Livermore Laboratory, for U.S. Department of Energy, Open-File report GJBX-123(78), 42 p. plus two appendixes.

Sandberg, C. A., 1983, Petroleum potential of wilderness lands in Nevada: U.S. Geological Survey Circular 902-H, 11 p.

EXPLANATION

Mineral resources of the Arrow Canyon Range Wilderness Study Area.

Name: Augusta Mountains
Area number: NV-030-108
Size (acres): 89,372

Status of mineral surveys: This area was not studied by the U.S. Bureau of Mines or the U.S. Geological Survey.

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): The Augusta Mountains area has a moderate potential for mercury in Triassic rocks and for manganese deposits in Paleozoic chert-argillite sequences and in Tertiary rocks. It has a moderate potential for gold and low potential for silver and other precious and base metal deposits in carbonate rocks, for massive sulfides deposits in Paleozoic chert-argillite sequences, and for nickel, copper, and platinum group elements in a Jurassic grabbro. The area has a moderate potential for geothermal energy near hot-water springs along major basin-and-range faults in the western part of the area, and a low potential for oil in Tertiary sedimentary and volcanic rocks and in pre-Tertiary carbonate rocks.

Mining activity: The Wildhorse mine, one mile south of the southeastern corner of the WSA produced 883 flasks of mercury in 1940 (Bailey and Phoenix, 1944, p. 111). The McCoy mine is two miles east of the Wildhorse mine and two miles southeast of the WSA. It produced 78 flasks of mercury in the years 1919-1920, and another 31 flasks in 1932-1934 (Bailey and Phoenix, 1944). In operations between 1954 and 1960, another 100 flasks of mercury was produced (U.S.Bureau of Mines, 1965). Both mines are in the Wildhorse mining district.

Drilling is planned in the east-central portion of the WSA to evaluate areas of suspected gold mineralization.

There are about 280 claims in the WSA, including large blocks of claims held by Minerals Exploration Company and FMC Minerals Corporation in the eastern and northeastern portions of the area (BLM records, July 1989). Geothermal leases cover 18,101 acres of the WSA, and 44,266 acres are covered by oil and gas leases.

Geology: The Augusta Mountains area consists of a major mountain range composed largely of shallow Triassic carbonate and clastic rocks, overlying a deep-water Paleozoic chert-argillite sequence. A Jurassic gabbro crops out in the southernmost part of the area. A Tertiary cover of tuff and sedimentary rocks is widespread in the northern, eastern, and southern parts of the area.

Recommendations: The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey. The southeastern portions of the WSA should be examined for the presence of mercury and precious metal resources. The favorability for zeolite reported by Higgins and others (1987) should be evaluated.

References:

Bailey, E. H., and Phoenix, D. A., 1944, Quicksilver deposits in Nevada: Nevada State Bureau of Mines and MacKay SChool of Mines Geology and Mining Series No. 41, 206 p.

Higgins, L. R., Earnest, D. F., and Cox, A. D., 1988, Nevada BLM Wilderness Study Areas mineral potential handbook: Nevada Mining Association, Reno, Nevada, 257 p.

Johnson, M. G., 1977, Geology and mineral deposits of Pershing County, Nevada: Nevada Bureau of Mines and Geology Bulletin 89, 115 p.

Lawrence, E. F., 1963, Antimony deposits of Nevada: Nevada Bureau of Mines and Geology Bulletin 61, 248 p.

Stewart, J. H., and McKee, E. H., 1977, Geology and mineral deposits of Lander County, Nevada *with a section on* mineral deposits by H. K. Stager: Nevada Bureau of Mines and Geology Bulletin, 88, 106 p.

U.S. Bureau of Mines, 1965, Mercury potential of the United States: U. S. Bureau of Mines Information Circular 8252, 376 p.

Wilden, Ronald, and Speed, R. C., 1974, Geology and mineral deposits of Churchill County, Nevada: Nevada Bureau of Mines and Geology Bulletin, 83, 95 p.

EXPLANATION

Mineral resources of the Augusta Mountains Wilderness Study Area.

Name:	Bad Lands
Area number:	NV-010-184
Size (acres):	9,426 of which 8,415 were studied at the request of the U.S. Bureau of Land Management.
Status of mineral surveys:	Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Johnson and others,1987).
Identified mineral resources (known):	No mineral resources have been identified in the wilderness study area.
Mineral resource potential (undiscovered):	The study area has low mineal resource potential for undiscovered deposits of all metallic minerals, oil, gas, and coal, and for geothermal energy. Factors contributing to this conclusion include low metal content of all geochemical samples, lack of known structures or traps for petroleoum resources, and lack of evidence of geothermal activity.within the study area.
Mining activity:	The nearest mining activity occurred about 2 to 5 miles east of the WSA in the Contact mining district. As of November 1983, no mining claims had been staked in the area.
Geology:	Upper Paleozoic (see geologic time chart in appendix) sedimentary rocks, the oldest rocks in the area, are exposed on the western slope of L & D Mountain, immediately east of the study area boundary. These rocks consist of a lower unit of thinly laminated detrital limestone and an upper unit of thinly bedded siliceous rocks including siltstone, mudstone, and argillite. The next oldest rock exposed in the vicinity, and the rock that underlies most of the study area, is the Tertiary Jarbidge Rhyolite, a thick sequence of reddish-gray, felsic volcanic extrusive rocks. The Jarbidge Rhyolite is overlain by easily weathered Tertiary sedimentary and pyroclastic rocks. Capping the steep slopes of the sedimentary and pyroclastic rocks is the Tertiary Cougar Point Welded Tuff. A Tertiary basalt flow and lapilli tuff unit overlies the Cougar Point Welded Tuff at the top of Big Devils Table south of the study area. Quaternary alluvial and colluvial deposits of at least two ages cover many of the steep slopes around the periphery of the study area.
Recommendations:	As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 1,011 acres that constitute the balance.

References:

Johnson, B.R., Richter, D.H., Grauch, V.J.S., and Kreidler, T.J., 1987, Mineral resources of the Bad Lands Wilderness Study Area, Elko County, Nevada: U.S. Geological Survey Bulletin 1725-A, 7 p.

Kreidler, T. J., 1984, Mineral investigation of the Badlands Wilderness Study Area, Elko County Nevada: U.S. Bureau of Mines Open-File Report MLA 18-84, 6 p.

EXPLANATION

Mineral resources of the Bad Lands Wilderness Study Area.

Name:	Black Rock Desert
Area number:	NV-020-620
Size (acres):	319,594 of which 174,300 were studied at the request of the U.S. Bureau of Land Management.
Status of mineral surveys:	Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Calzia and others, 1987).
Identified mineral resources (known):	No mineral resources have been identified in the Wilderness Study Area.
Mineral resource potential (undiscovered):	Geologic, geochemical, geophysical, and mineral surveys indicate that the study area has moderate potential for gold, silver, mercury, lithium, and geothermal resources and low potential for oil and gas resources although no mines or prospects were identified within this area.
Mining activity:	There is no known mineral activity within the WSA. The Sulphur mining district is located near the southeastern portion of the WSA. It has produced silver, sulphur and mercury, and it is currently producing gold. The current operation is a heap leach operation operated by Standard Slag Company. Other industry exploration efforts in the area have reported significant gold mineralization. July 1989 BLM records show about 50 mining claims in the WSA, mostly in the northwestern portion. Six oil and gas leases cover 19,560 acres of the WSA, and six geothermal leases cover 12,026 acres. The Pinto Hot Springs KGRA is located on the northwestern border of the area. The Double Hot Springs KGRA is 7 miles southwest of the study area.
Geology:	The Black Rock Desert is in the Basin and Range physiogrpahic province. This province is characterized by northwest-trending fault-bounded mountains separated by wide parallel valleys. The Black Rock Desert is within a down-dropped fault block that is filled by Cenozoic sediments. Hills and mesas norhwest of the study area are underlain by Triasic-Jurrassic (see appendix for geologic time chart) Phyllite, quartzite, and limestone, Cretaceous quartz monzonite, and Miocene-Pliocene tuffs, rhyolite flows, and basalt.
Recommendations:	As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 145,294 acres that constitute the balance.

References:

Calzia, J. P., Lawson, W. A., Dohrenwend, J. C., Plouff, Donald, Turner, Robert, and Olson, J. E., 1987, Mineral Resources of the Black Rock Desert Wilderness Study Area, Humboldt County, Nevada: U.S. Geological Survey Bulletin 1726-E, 13 p.

Higgins, L. R., Earnest, D. F., and Cox, A. D., 1988, Nevada BLM Wilderness Study Areas mineral potential handbook: Nevada Mining Association, Reno, Nevada, 257 p.

Olson, J. E., 1985, Mineral resources of the Black Rock Desert Wilderness Study Area, Humboldt County, Nevada: U.S. Bureau of Mines Open File Report MLA 65-85, 19 p.

Vanderburg, W. O., 1938, Reconnaissance of mining districts in Humboldt County, Nev.: U.S. Bureau of Mines Information Circular 6995, 54 p.

Willden, Ronald, 1964, General geology and mineral deposits of Humboldt County, Nevada: Nevada Bureau of Mines Bulletin 59, 154 p.

Mineral resources of the Black Rock Desert Wilderness Study Area.

Explanation, mineral resources of the Black Rock Desert Wilderness Study Area.

Name: Blue Eagle

Area number: NV-060-158/199

Size (acres): 60,310 of which 51,350 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Lund and others, 1987).

Identified mineral resources (known): There are no identified mineral resources in the Blue Eagle Wilderness Study Area. A possible low-grade, gold-bearing jasperoid-shale sequence is present in the north-central part of the study area. Gold and silver occur in fault zones and associated quartz veins just outside the southwestern part of the study area. Outcrops of vitric tuff (which have been mined as a decorative building stone) occur in the northern part of the study area.

Mineral resource potential (undiscovered): The entire Blue Eagle Wilderness Study Area has high energy resource potential for petroleum, although appropriate traps have not been identified. Most of the area is covered by oil and gas leases.

Moderate mineral resource potential is recongized for three types of metal occurrence in five areas. The southwestern corner of the area has moderate potential for tungsten and polymetallic base-metal (bismuth, molybdenum, copper, lead, and zinc) deposits in hydrothermal (low- to medium-temperature) replacement deposits in low-grade metamoprhic rocks and for gold and silver in quartz veins associated with the replacement imineralization. The north and central parts of the area have moderate potential for gold in disseminated deposits associated with jasperoid occurrences. Two areas on the southeastern and western sides of the wilderness study area have moderate potential for zinc and antimony deposits possibly associated with hydrothermal fluids that moved along highly brecciated fault zones.

The study area has low resource potential for all other metals, nonmetals, geothermal energy, and coal.

Mining activity: No organized mining districts and no mines, prospects, or patented claims are situated in the wilderness study area. An unpatented group of claims in the north-central part of the area is located on jasperoid outcrops associated with shale. In 1981, 12 holes were drilled into the jasperoid-shale sequence in a joint venture between Energy Reserves Group of Golden, Colorado, and U.S. Minerals Exploration Co., of Arvada, Colorado. No significant gold anomalies were found and the claims were allowed to lapse. The claims were restaked in 1984, and a new block of claims was staked contiguous to and west of the old group by J. W. Mueller, Arvada, Colorado.

Outside the southwestern corner of the wilderness study area, faults and associated quartz veins containing gold and silver are exposed by 16 prospect pits, 1 shaft, and 3 adits. These workings are operated intermittently, and are covered by a group of unpatented claims. North of the wilderness study area, vitric tuff has been mined for decorative building stone at the El Padre mine. It is operated intermittently.

Geology: The Grant Range is an east-tilted fault block. The faulting exposed a stratigraphic section, section, from west to east, of thick carbonate sedimentary rocks of the Paleozoic (see geologic time scale continental shelf that are overlain by Tertiary basin deposits and by a sequence of Tertiary volcanic and basin-fill deposits. The oldest exposed rocks, which are on the western side of the range, are metamorphosed lower Paleozoic rocks. In detail, the range is structurally complex; the area has been affected by both Mesozoic compressional and Tertiary extensional processes.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 8,960 acres that constitute the balance. More detailed mapping, and surface and subsurface sampling are needed to determine the extent and grade of gold and silver occurrences adjacent to the southwest corner of the wilderness study area.

References:

Lund, K.L., Nash, J.T., Beard, L.S., Blank, H.R., Jr., and Tuftin, S.E., 1987, Mineral resources of the Blue Eagle Wilderness Study Area, Nye County, Nevada: U.S. Geological Survey Bulletin 1731-D, 19 pages.

Mineral resources of the Blue Eagle Wilderness Study Area.

Explanation, mineral resources of the Blue Eagle Wilderness Study Area.

Name: Blue Lakes

Area number: NV-020-600

Size (acres): 20,508 of which 16,400 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Bergquist and others, 1987).

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): There is a low potential for undiscovered gold and silver resources and associated antimony, copper, lead, mercury, molybdenum, zinc, and uranium throughout the study area. A low potential exists for undiscovered tungsten resources in skarn in 3 small areas of limestone in the northern part of the study area.

Mining activity: The Warm Springs mining district is about seven miles north of the wilderness study area and has produced 22,870 troy ounces of gold. The Varyville mining district, about six miles south of the wilderness study area, has produced 1,704 troy ounces of gold. The Leonard Creek mining district is about three miles southeast of the study area and is credited with 1,176 troy ounces of gold production, mostly placer, by the U.S. Bureau of Mines. The Pine Forest (Boyd Basin) mining district abuts the north boundary of the WSA; U.S. Bureau of Mines records show production of 1,305 troy ounces of gold and 418 troy ounces of silver here.

July 1989 BLM records show 49 lode and 2 placer claims active in or adjacent to the WSA.

Geology: The study area is underlain mostly by granitic rocks of Jurassic and Cretaceous age (see geologic time scale). The northeastern part of the study area is underlain by folded and faulted marine metasedimentary rocks of Permian(?) and Triassic age that are intruded by the younger granitic rocks.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 4,108 acres that constitute the balance.

References:

Bennett, R.E., 1973, Mineral resources of the Blue Lakes proposed primitive area, Humboldt County, Nevada: U.S.Bureau of Land Management Open-File Mineral Report, 29 p.

Bergquist, J.R., Plouff, Donald, Turrin, B.D., Smith, J.G., Turner, R.L., and Willett, S.L., 1987, Mineral resources of the Blue Lakes Wilderness Study Area, Humboldt County, Nevada: U.S. Geological Survey Bulletin 1726-D, 18 p.

Conners, R.A., Robinson, M.L., Bukofski, J.F., Meyer, W.T., and Howarth, R.J., 1982, Geochemical and geostatistical evaluation of wilderness study areas, Winnemucca District, northwestern Nevada: Golden, Colorado, Barringer Resources, Incorporated for U.S. Bureau of Land Management contract Open-File Report, v. 1-5, 2 plates.

Hill, J.M., 1912, The mining districts of the western United States: U.S. Geological Survey Bulletin 507, 309 p.

Johnson, M.G., 1973, Placer gold deposits of Nevada: U.S. Geological Survey Bulletin 1356, 118 p.

Lawrence, E. F., 1962, Antimony occurrences in Nevada: Nevada Bureau of Mines Map 2, scale 1:1,000,000.

Smith, J.G., 1973, Geologic map of the Duffer Peak Quadrangle, Humboldt County, Nevada: U.S. Geological Survey Miscellaneous Geologic Investigations Map I-606, scale 1:48,000.

Vanderburg, W.O., 1938, Reconnaissance of mining districts in Humboldt County, Nevada: U.S. Bureau of Mines Information Circular 6995, 54 p.

Wilden, Ronald, 1964, Geology and mineral resources of Humboldt County, Nevada: Nevada Bureau of Mines and Geology Bulletin 59, 154 p.

Willett, S.L., 1986, Mineral resources of the Blue Lakes and Alder Creek Wilderness Study Areas, Humboldt County, Nevada: U.S. Bureau of Mines Open-File Report MLA 33-86, 21 p.

Mineral resources of the Blue Lakes Wilderness Study Area.

Explanation, mineral resources of the Blue Lakes Wilderness Study Area.

Name: Bluebell

Area number: NV-010-027

Size (acres): 55,665 of which 41,324 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Ketner and others, 1987).

Identified mineral resources (known): Carlin-type disseminated gold occurence in the southern part of the WSA, between Morgan Pass and Erickson Canyon. High-calcium limestone throughout most of the WSA.

Mineral resource potential (undiscovered): Parts of the Bluebell Wilderness Study Area have high to moderate potential for gold resources, and low resource potential for tin, tungsten, beryllium, uranium, and thorium. There is high resource potential for high-purity limestone, and moderate resource potential for high-purity phosphate. The area has low resource potential for oil and gas.

Mining activity: Battle Mountain Exploration Co. drilled the disseminated gold occurrence during the summers of 1985-1988, and in the summer of 1989 they did geophysical work. Numerous unpatented mining claims on file with the BLM.

Geology: Rock formations of the Bluebell Wilderness Study Area are mainly limestone and dolomite ranging in age from Cambrian to Permian (245 to 540 million years old). Less extensive areas are underlain by younger igneous rocks and unconsolodated alluvium. Principal structures include low angle planar faults that locally cut out portions of the stratigraphic column, listric, or curved, faults that merge from high angles to low angle, and near-vertical planar faults. Some of the high-angle faults are mineralized with gold.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 14,341 acres that constitute the balance.

References:

Brown, S.D., 1985, Mineral resources of part of the Bluebell (NV-010-027) and Goshute Peak (NV-010-033) Wilderness Study Areas, Elko County, Nevada: U.S. Bureau of Mines Open-File Report MLA 66-85, 22 p.

Day, W.C., Elrick, Maya, Ketner, K.B., and Vaag, M.K., 1987, Geologic map of the Bluebell and Goshute Peak Wilderness Study Areas, Elko County, Nevada: U.S. Geological Survey Miscellaneous Field Studies Map MF-1932.

Granger, A.E., Bell, M.M., Simmons, G.C., Lee, Florence, 1957, Geology and mineral resources of Elko County, Nevada: Nevada Bureau of Mines Bulletin 54, 190 p.

Hill, J.M., 1916, Notes on some mining districts in eastern Nevada: U.S. Geological Survey Bulletin 648, p. 97-98.

Ketner, K.B., Day, W.C., Elrick, M., Vaag, M.K., Gerlitz, C.N., Barton, H.N., Saltus, R.S., and Brown, S.D., 1987, Mineral resources of the Bluebell and Goshute Peak Wilderness Study Areas, Elko County, Nevada: U.S. Geological Survey Bulletin 1725-C, 18 p.

Mineral resources of the Bluebell Wilderness Study Area.

Explanation, mineral resources of the Bluebell Wilderness Study Area.

Name: Bonelli Peak
Area number: NV-050-238
Size (acres): 3,000

Status of mineral surveys: This area was not studied by the U.S. Bureau of Mines or the U.S. Geological Survey.

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): The Bonelli Peak wilderness study area has low to moderate potential for gold, silver, copper, lead, zinc, beryllium, feldspar, and mica. There is no potential for oil and gas.

Mining activity: Jemex Resources, Inc. had claims in the area recently and Leavitt Boyd presently (July 1989) has 14 claims on the Lakeside mine, which is inside of the WSA. These claims or associated ones have been held since at least 1942.

Geology: The Bonelli Peak wilderness study area is underlain entirely by Precambrian metamorphic rocks consisting of gneiss and schist with lesser amounts of gneissic granite, pyroxenite, migmatite, pegmatite, and marble.

Recommendations: The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

Great Basin GEM Joint Venture, 1983, Lake Mead G-E-M resources area (GRA no. NV-35) technical report (WSA's NV-050-0231, 050-0233, 050-0235, 050-0236, and 050-0238): Prepared for the U.S. Bureau of Land Management, contract YA-553-RFP2-1054, 33 p.

Longwell, C. R., Pampeyan, E. H., Bowyer, Ben, and Roberts, R. J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines Bulletin 62, 218 p.

EXPLANATION

Mineral resources of the Bonelli Peak Wilderness Study Area.

Name: Buffalo Hills

Area number: CA-020-619

Size (acres): 47,315

Status of mineral surveys: This area was not studied by the U.S. Geological Survey or the U.S. Bureau of Mines.

Identified mineral resources (known): No known mineral occurrences or deposits are present within the wilderness study area.

Mineral resource potential (undiscovered): The study area has moderate mineral resource potential for gold, silver, copper, lead, and zinc. Areas of volcanic-derived sediments and lake deposits have moderate resource potential for clay, zeolites, and pozzolan.

Mining activity: There is no known mineral production from the wilderness study area. No current mining claims are located within the wilderness study area according to 1988 U.S. Bureau of Land Management records. The area is not within any mining districts and no locations are shown in MILS.

Geology: The study area is entirely within an extensive area of Miocene to Pliocene olivine basalt flows and dikes. Minor tuff and volcanic derived sediments including shale, sandstone, mudstone, and lake sediments, occur locally. Several north trending faults occur in the study area. Sedimentary rocks in this area are also known to contain abundant vertebrate and plant fossils of Barstovian age.

Recommendations: The wilderness study area should be studied as part of a comprehensive mineral survey by the Bureau of Mines and Geological Survey. Future work in the area, in the form of geologic mapping and detailed geochemical sampling is needed to accurately assess the potential for precious and metallic mineral occurrences, and the sediment associated resources, zeolite, clay, and pozzolan.

References:

Bonham, H.F., 1969, Geology, and mineral deposits of Washoe and Storey Counties, Nevada: Nevada Bureau of Mines Bulletin 70, 140 p.

Clark, W.B., 1970, Gold districts of California: California Division of Mines and Geology Bulletin 193, 186 p.

Lydon, P.A., Gay, T.E., Jr., and Jennings, O.P., compilers, 1976, Westwood (Susanville) sheet: California Division of Mines and Geology Geologic Map of California, scale 1:250,000.

U.S. Bureau of Land Management, 1989, California state-wide wilderness study report: draft copy, part 3, v. 2.

U.S. Bureau of Mines, 1989, Mineral Industry Location System (MILS).

Vercouter, T.C., Sorensen, M.L., Frisken, J.G., and Plouff, Donald, 1988, Mineral resources of the Twin Peaks Wilderness Study Area, Washoe County Nevada, and Lassen County, California: U.S. Geological Survey Bulletin 1706-A, 13 p.

EXPLANATION

M/B Geologic terrane having moderate mineral resource potential for gold, silver, copper, lead, zinc, clay, zeolites, and pozzolan with certainty level B

Mineral resources of the Buffalo Hills Wilderness Study Area.

Name: Burbank Canyon
Area number: NV-030-525A
Size (acres): 13,395

Status of mineral surveys: This area was not studied by the U.S. Bureau of Mines or the U.S. Geological Survey.

Identified mineral resources (known): No mineral resources have been identified within the Wilderness Study Area.

Mineral resource potential (undiscovered): The Burbank Canyon area has a moderate to high potential for gold, silver, lead, and zinc vein deposits, copper and tungsten skarns, and porphyry molybdenum and copper deposits. Deposits of these types are known from surface exposures (Red Canyon and Gardnerville mining districts) or from company drilling within or near the proposed wilderness area. A low potential exists for development of geothermal energy along mountain frontal faults on the east side of the area.

Mining activity: The Burbank Canyon WSA occupies much of the eastern half of the Red Canyon mining district. The Red Canyon district is credited with more than $100,000 production of gold and silver. Most of this production came from the Longfellow mine, in the WSA. The San Juan-El Capitan mine also produced gold from the WSA.

Silver-lead-zinc production is recorded from the Lucky Bill mine, about one mile north of the WSA. Silver production is credited to the Vera Grande property, about seven miles west of the WSA.

The Mountain Gold patented claims, near the southern boundary, have been cherry-stemmed out of the WSA. Dixon (1971) noted other occurrences and geochemically anomalous sites in the WSA.

July 1989 BLM records show at least 30 unpatented mining claims active in the WSA.

Geology: The Burbank Canyon area forms the eastern part of a major basin and range fault block comprising the southern Pine Nut Range. Rocks in the area consist of a thick sequence of Triassic and Jurassic marine and nonmarine sedimentary and volcanic rocks intruded by Cretaceous granitic and dioritic rocks. A relatively small part of the area is covered by Tertiary andesitic flows and breccias.

Recommendations: Because of the previous production, reported geochemical anomalies, and patented and unpatented mining claims, the Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

Dixon, R.L., 1971, The geology and ore deposits of the Red Canyon mining district, Douglas County, Nevada: Reno, University of Nevada MS thesis, 88 p.

Great Basin GEM Joint Venture, 1983, Burbank Canyon G-E-M Resource Area (GRA No. NV-10) Technical Report (WSA NV 030-525A): Reno, Nevada, Great Basin GEM Joint Venture for U.S. Bureau of Land Management contract YA-554-RFP2-1054 Open-File Report, 30 p.

Hill, J.M., 1915, Some mining districts in northeastern California and northwestern Nevada: U.S. Geological Survey Bulletin 594, 200 p.

Moore, J.G., 1969, Geology and mineral deposits of Lyon, Douglas, and Ormsby Counties, Nevada: Nevada Bureau of Mines and Geology Bulletin 75, 45 p.

Overton, T.D., 1947, Mineral resources of Douglas, Ormsby, and Washoe Counties, Nevada: Nevada Bureau of Mines Bulletin 46, 91 p.

EXPLANATION

Mineral resources of the Burbank Canyon Wilderness Study Area.

Name: Calico Mountains
Area number: NV-020-019
Size (acres): 67,647

Status of mineral surveys: This area has not been studied by the U.S. Bureau of Mines or the U.S. Geological Survey.

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area.

Extensive areas of sand and gravel occur within the WSA. However, the distance to markets combined with the abundance of these commodities in the region prevent these materials from being classified as identified resources.

Mineral resource potential (undiscovered): Resource potential for epithermal gold and (or) silver deposits is low to moderate in the older granitic and metamorphic rocks and low in the rest of the area. Resource potential for perlite (for use in plaster and insulation), pozzolan (for use in cement), and uranium is low in the area underlain by the Tertiary rocks. Resource potential for geothermal energy is moderate in the entire area. No evidence is available to indicate the presence of any resource potential for oil or gas in this area.

Mining activity: There may have been some turquoise produced from the JJ and Will claims. Geochemical exploration and some drilling are reported in the area.

July 1989 BLM records show 460 claims in the WSA. These include blocks by Lacana Gold Incorporated, Placer Dome U.S., Incorporated, Dragonfly Mining Company, Callahan Mining Corporation, and Ferret Exploration Company.

Geology: The area is underlain largely by lava flows and pyroclastic rocks, interlayered with sedimentary rocks. Older granitic and metamorphic rocks that presumably underlie the Tertiary rocks, are exposed in small belt in the northern part of the area.

Recommendations: The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

Barringer Resources, Inc., 1982, Geochemical and geostatistical evaluation of wilderness study areas, Winnemucca district, northwest Nevada, 5 v.: Golden, Colo. (available from NTIS, U.S. Department of Commerce, Springfield, VA 22161,or call Information Center and Bookstore (202) 377-0365).

Johnson, M.G., 1977, Geology and Mineral Deposits of Pershing County, Nevada: Nevada Bureau of MInes and Geology Bull. 89, 115 p.

Muffler, L.J.P., ed., Assessment of geothermal resources of the United States-1978: U.S. Geological Survey Circular 790, 163p.

Neumann, Terry R. and Close, Terry J., 1985, Mineral Resources of the High Rock Lake Wilderness Study Area (BLM No. NV-020-07), Humboldt County, Nevada: U.S. Bureau of Mines Open File Report MLA 38-85, 14 p.

Sandberg, C.A., 1983, Petroleum potential of wilderness lands in Nevada, *in* Miller, B.M., ed., Petroleum potential of wilderness lands in the western United States: U.S. Geological Circular 902-A-P, p. H1-H11.

Wilden, Ronald, 1963, General Geology and Mineral Deposits of Humboldt County, Nevada: Nevada Bureau of Mines and Geology, Bull, 59, 154 p.

Wilden, Ronald, 1964, Geology and mineral deposits of Humboldt County, Nevada: Nevada Bureau of Mines Bulletin 59, 115 p.,

EXPLANATION

Mineral resources of the Calico Mountains Wilderness Study Area.

Name: Carson Iceberg
Area number: NV-030-532
Size (acres): 550

Status of mineral surveys: This area has been studied as part of mineral surveys by the U.S. Bureau of Mines (Miller, 1988) and U.S. Geological Survey (Keith and Miller, 1988).

Identified mineral resources (known): No mineral resources are identified in the wilderness study area. Samples from the area contained uneconomic amounts of gold, silver, copper, lead, zinc, mercury, arsenic, and molybdenum.

Mineral resource potential (undiscovered): The study area has low resource potential for gold in placer deposits in gravels from the Carson River and some of its tributaries. The study area exclusive of the stream sediments also has low resource potential for silver in small vein type deposits.

Mining activity: The Log Cabin (Dixon) Mine, about 2 miles northwest, is estimated to have 900,000 tons of indicated marginal reserves with 0.1 to 0.4 troy ounce of gold per ton (Keith and others, 1983). Production from the Silver Mountain mining district, which includes most of the study area, has not all been recorded but is estimated to have been at least $300,000 (Clark, 1977, p. 28)

The Wilderness Study Area has one small, abandoned prospect pit but no active mines or claims (July 1989 BLM records). Groups of active mining claims lie to the west and north, outside the WSA.

Geology: The area is underlain by a thin layer of interbedded lava flows and mudflows of Tertiary age overlying a granitic pluton of Cretaceous age. Locally, both of these units have been intruded by younger rhyolitic dikes.

Recommendations: Additional work is not recommended for this area due to the small size of the area, the small amount of hydrothermal alteration, and the small number of and concentrations in geochemical anomalies.

References:

Clark, W.B., 1977, Mines and mineral resources of Alpine County, California, with sections on the Zaca gold-silver mine and the Leviathan sulfur mine by James R. Evans: California Division of Mines and Geology County Report 8, 48 p.

Keith, W.J., Chaffee, M.A., Plouff, Donald, and Miller, M.S., 1983, Mineral resource potential of the Carson-Iceberg Roadless Areas, central Sierra Nevada, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1416-B, scale 1:62,500.

Keith, W.J., and Miller, M.S., 1988, Mineral Resources of the Carson Iceberg Wilderness Study Area, Alpine County, California: U.S. Geological Survey Open-File Report 88-273, 22 p.

Miller, M.S., 1988, Mineral Resources of the Carson-Iceberg Wilderness Study Area, Alpine County, California: U.S. Bureau of Mines Open File Report MLA 18-88, 20 p.

Purdy, T.L., and Rowan, L.C., 1985, Map showing distribution of altered rocks, faults, and linear features in the Walker Lake 1o by 2o Quadrangle, Nevada and California: U.S. Geological Survey Miscellaneous Investigations Map I-1643, scale 1:250,000.

Rowan, L.C., Krohn, M.D., and Purdy, T.L., compilers, 1980, Generalized map of occurrences of limonitic rocks in the Walker Lake 1° by 2° Quadrangle, California and Nevada: U.S. Geological Survey Open-File Report 80-232, scale 1:250,000.

Mineral resources of the Carson Iceberg Wilderness Study Area.

Explanation, mineral resources of the Carson Iceberg Wilderness Study Area.

Name:	Cedar Ridge
Area number:	NV-010-088
Size (acres):	10,009
Status of mineral surveys:	This area was not studied by the U.S. Bureau of Mines or U.S. Geological Survey.
Identified mineral resources (known):	No mineral resources have been identified in the Wilderness Study Area.
Mineral resource potential (undiscovered):	The entire area is underlain by Paleozoic rocks and considered to have low potential for resources of gold, because it lies within the central Nevada disseminated gold deposit belt. The NW alignment of many carbonate hosted gold deposits in Nevada suggests that there is some type of subtle geologic control on mineralization in this belt. The eastern part of the area has moderate potential for petroleum in buried Cenozoic deposits.
Mining activity:	There no known active mines within the WSA. July 1989 BLM records show 12 active and 3 inactive mining claim locations within or adjacent to the WSA.
Geology:	The central one third of the area (Cedar Ridge) is comprised of conglomerate, limy sandstone and limestone of upper Paleozoic age. The bounding valleys contain unconsolidated alluvium mostly of Quaternary age.
Recommendations:	Because of its location in the central Nevada disseminated gold belt, geochemical sampling of stream sediments and rock samples looking for Au, Ag, and trace elements commonly associated with these precious metals, are recommended, as well as seismic reflection studies to define the Paleozoic bedrock surface and other reflectors that might define structures favorable for oil. The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.
References:	Matthews, G. W. and Blackburn, W. H., 1983, Cedar Ridge Gem Resource Area (NV-010-05), Elko County, Nevada: TERRADATA, (BLM Contract No. YA-553-CT2-1042). Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: unpublished report. Sandburg, C.A., 1982, Petroleum potential of wilderness Lands, Nevada: U.S. Geological Survey Miscellaneous Investigation Series Map I-1542.

Sandburg, C.A. 1983, Petroleum potential of Wilderness Lands in Nevada [in] Petroleum Potential of Wilderness Lands in the western United States edited by Miller, B.M: U. S. Geological Survey Circular 902-A-P.

EXPLANATION

Mineral resources of the Cedar Ridge Wilderness Study Area.

Name: China Mountain
Area number: NV-020-406P
Size (acres): 10,358

Status of mineral surveys: This area was not studied by the U.S. Bureau of Mines or the U.S. Geological Survey

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): The study area has low potential for undiscovered mineral resources of antimony, copper, gold, lead, silver, and zinc.

Mining activity: At least one mine in the study area, the Ore Drag, has had past production. It was first worked in the early 1940's, and produced approximately 34 tons of ore containing antimony, tungsten, and small amounts of silver. Within one mile of the northeast corner of the area, 5,331 oz of silver, 3 oz of gold, 800 lbs of copper, and 66,700 lbs of lead were recovered from 341 tons of ore from 1944 to 1945.

July 1989 BLM records show approximately 259 active mining claims in the WSA. Many of the claims are along a swarm of northwest-trending faults in the vicinity of Hoffman Canyon. Hecla Mining recently abandoned 19 additional claims.

Geology: The southern part of the study area is underlain by upper Paleozoic and Triassic sedimentary and metamorphic rocks that consist of chert, argillite, shale, greenstone, and minor amounts of siltstone, sandstone, conglomerate, and limestone. In the north part of the study area, these rocks are overlain by lower Triassic andesite flows, rhyolite tuffs and clastic rocks. All of these rocks are cut by several north-trending faults. The southeastern part of the study area is downdropped by a northeast-trending range front fault zone.

Recommendations: The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

Johnson, M. G., 1977, Geology and mineral resources of Pershing County, Nevada: Nevada Bureau of Mines and Geology Bulletin 89, 115 p.

EXPLANATION

Mineral resources of the China Mountain Wilderness Study Area.

Name: Clan Alpine Mountains

Area number: NV-030-102

Size (acres): 196,128 of which 68,458 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Hardyman and others, 1988).

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area. Small amounts gold, silver and antimony have been produced from mines in the Alpine mining district, which is in the northern part of the WSA. The Wonder mining district, located about three miles south of the WSA, was a major producer of silver and gold. Within the area studied, a zone near the headwaters of Starr Canyon contains anomalous amounts of silver and gold.

Mineral resource potential (undiscovered): The Clan Alpine Mountains Wilderness Study Area contains one area of high mineral resource potential and two areas of moderate mineral resource potential for undiscovered gold and silver resources, two areas of moderate mineral resource potential for undiscovered molybdenum resources, and two areas of moderate mineral resource potential for undiscovered antimony resources. The rest of the area has a low potential for these and all other undiscovered metals, and the entire area has a low resource potential for undiscovered oil and gas and geothermal energy. A small area along the east-central margin of the study area has low mineral resource potential for undiscovered zeolite resources.

Mining activity: There are no known active mines in the WSA. The Tungsten Mountain mine was active between 1954 and 1961, and the Nevada Gold group produced much of the Alpine mining district's gold, silver, and lead prior to 1940. The Antimony King mine was active in 1983.

BLM mining records (July 1989) show approximately 673 active and 635 inactive claims dating from 1951 located within or adjacent to the WSA.

Geology: Rocks exposed in the study area are chiefly Tertiary (see geologic time chart in appendix) igneous rocks and minor amounts of Mesozoic sedimentary rocks.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 127,670 acres that constitute the balance. The anomalous zone within the area studied warrants additional examination.

References:

Great Basin GEM Joint Venture, 1983a, Clan Alpine Mountains G-E-M Resources Area (GRA No. NV.-5) Technical Report (WSA NV-030-102): Prepared for the U.S. Bureau of Land Management, contract YA-554-RFP-1054, 38 p.

Hardyman, R. F., Brooks, W. E., Blaskowski, M. J., Barton, H. N., Ponce, D. A., and Olson, J. E., 1988, Mineral resources of the Clan Alpine Mountains Wilderness Study Area, Churchill County, Nevada: U.S. Geological Survey Bulletin 1727-B, 16 p.

Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: unpublished report.

Olson, J. E., 1988, Mineral resources of the Clan Alpine Mountains Study Area, Churchill County, Nevada: U.S. Bureau of Mines Open File Report MLA 4-87, 22 p.

Mineral resources of the Clan Alpine Mountains Wilderness Study Area.

Explanation, mineral resources of the Clan Alpine Mountains Wilderness Study Area.

Name: Clover Mountains

Area number: NV-050-139

Size (acres): 84,935 of which 84,165 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Moring and others, 1988).

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area. However, clinoptilolite, a zeolite mineral, occurs near Fountain of Youth Spring in the central part of the study area. Deposits of stone, sand, and gravel in the study area are suitable for local construction uses, but distance to markets make development unlikely.

Mineral resource potential (undiscovered): A mineral resource assessment for the Clover Mountains Wilderness Study Area was completed by Moring and others (1988). The results from this study indicate that two areas in the north part of the study area have moderate resource potential for molybdenum. Most of the southern part of the area has low potential for gold, silver, zeolites, and oil and gas resources. Occurrences of sand, gravel, and stone in the study area are too inaccessible and remote to have any significant resource potential.

Mining activity: The Pennsylvania Copper Mine (Hope Mine) produced $70,000 in gold, silver, lead, and copper before 1986. The Lucky Boy barite mine is not active. Barium was produced from barite veinlets in volcanics.

July 1989 BLM records show 405 claims in and near the WSA. These include claim blocks by Lincoln Exploration Company, Lana Resources U.S. Inc., Houston International Mineral Corporation (molybdenum), Amoco Minerals Company, Lana Gold Corporation, U.S. (silver, copper, and gold).

Geology: The Clover Mountains Wilderness Study Area lies along the southern edge of the Caliente cauldron complex of Ekren and others (1977). The study area is underlain mostly by ash-flow tuff and other associated volcanic rocks derived from the cauldron complex. Folded and faulted Paleozoic and Mesozoic sedimentary rocks crop out outside the caldera margin in the south and west parts of the study area.

Recommendations: No further work is recommended.

References:

Ekren, E.B., Orkild, P.P., Sargent, K.A., and Dixon, G.L., 1977, Geologic map of Tertiary rocks, Lincoln County, Nevada: U.S. Geological Survey Miscellaneous Investigations Map I-1041, scale 1:250,000.

Horton, 1963, An Inventory of Barite Occurrences in Nevada: Nevada Bureau of Mines and Geology, Report 4.

McHugh, E.L., 1987, Mineral resources of the Clover Mountains study area, Lincoln County, Nevada: U.S. Bureau of Mines Open-File Report MLA 28-87, 29 p.

Moring, Barry, Blank, H.R., Jr., Hoffman, J.D., and McHugh, E.L., 1988, Mineral resources of the Clover Mountains Wilderness Study Area, Lincoln County, Nevada: U.S. Geological Survey Bulletin 1729-D, 18 p.

Noble, D.C., and McKee, E.H., 1972, Description and K-Ar ages of volcanic rocks of the Caliente volcanic field, Lincoln County, Nevada, and Washington County, Utah: Isochron/West, no. 5, p. 17-24.

Papke, 1983, Barite in Nevada: Nevada Bureau of Mines and Geology, Bull. 98.

Tschanz, C.M., and Pampeyan, E.H., 1970, Geology and mineral resources of Lincoln County, Nevada: Nevada Bureau of Mines and Geology Bulletin 73, 183 p.

Mineral resources of the Clover Mountains Wilderness Study Area.

Explanation, mineral resources of the Clover Mountains Wilderness Study Area.

Name:	Clover Mountains (Addition)
Area number:	NV-050-139
Size (acres):	770
Status of mineral surveys:	This area was not studied by the U.S. Geological Survey or the U.S. Bureau of Mines.
Identified mineral resources (known):	The Pennsylvania mine is in the Clover Mountains (Addition) WSA. The property has multiple workings and is also known as the Pennsylvania district. The owner estimates a 700,000 ton resource of leachable ore containing 0.039 oz/ton gold.
Mineral resource potential (undiscovered):	The Clover Mountains Addition has high resource potential for gold and moderate resource potential for silver, copper, lead, and molybdenum There is low potential for zeolites, and oil and gas resources. Occurrences of sand, gravel, and stone in the study area are too inaccessible and remote to have any significant resource potential.
Mining activity:	Exploration and development work is currently under way at the Pennsylvania mine. Workings at the mine include three shafts 620, 265, and 110 ft deep; eight pits and open cuts. Ore mined prior to 1881 yielded $20-25/ton rock, additional shipments were made in 1914. Bureau of Mines records indicate 74 tons produced from 1941 through 1942 (50 oz gold, 691 oz silver, 1,280 lb copper, and 192 lb lead were recovered.) About 90,000 tons of ore averaging 0.11 oz/ton gold and 1.0 to 1.5 oz/ton silver were mined in 1986 by heap leaching. By October 1986, about 2,000 oz gold and 15,000 oz silver were produced.
Geology:	The Clover Mountains Addition study area lies along the southern edge of the Caliente cauldron complex of Ekren and others (1977). The study area is underlain mostly by ash-flow tuff and other associated volcanic rocks derived from the cauldron complex. Folded and faulted Paleozoic and Mesozoic sedimentary rocks crop out outside the caldera margin.
Recommendations:	The wilderness study area should be studied as part of a comprehensive mineral survey by the Bureau of Mines and Geological Survey.

References:

Ekren, E.B., Orkild, P.P., Sargent, K.A., and Dixon, G.L., 1977, Geologic map of Tertiary rocks, Lincoln County, Nevada: U.S. Geological Survey Miscellaneous Investigations Map I-1041, scale 1:250,000.

McHugh, E.L., 1987, Mineral resources of the Clover Mountains study area, Lincoln County, Nevada: U.S. Bureau of Mines Open-File Report MLA 28-87, 29 p.

Moring, Barry, Blank, H.R., Hoffman, J.D., and McHugh, E.L., 1988, Mineral resources of the Clover Mountains Wilderness Study Area, Lincoln County, Nevada: U.S. Geological Survey Bulletin 1729-D, 18 p.

Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: Reno, Nevada, unnumbered page.

Tschanz, C.M., and Pampeyan, E.H., 1970, Geology and mineral resources of Lincoln County, Nevada: Nevada Bureau of Mines and Geology Bulletin 73, 183 p.

Mineral resources of the Clover Mountains Addition Wilderness Study Area.

Explanation, mineral resources of the Clover Mountains Addition Wilderness Study Area.

Name: Cougar Canyon (Tunnel Springs)

Area number: UT-040-123/NV-050-166

Size (acres): 15,968 acres (5,400 acres in Nev., 10,568 acres in Utah) of which 6,919 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Conrad and others, 1990).

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): The geologic environment is permissive for small deposits of a number of base- and precious-metals, including gold, silver, copper, lead, zinc, mercury, and molybdenum, but there is no indication that any of these commodities are present in appreciable amounts in the study area (Tschanz and Pampeyan, 1970; Conrad and others, 1990). Minor hydrothermal alteration, present several miles south of the study area, and locally abundant faulting that would provide pathways for metal-bearing hydrothermal fluids, suggest that there is low potential for gold, silver, copper, and mercury in the study area. There is low potential for zeolite and perlite resources as well as cinders and building stone, but the area is located far from major markets. There is no potential for oil and gas.

Mining activity: No mining districts, or mines are known in the WSA. The Acoma perlite prospect lies 2 miles west of the area and the Sunnybrook gold prospect lies 2 miles south. The Orma-Valoy silver claims (nos.1-32) are within the WSA. Oil and gas leases blanket 15,730 acres of the WSA. A sample from the westernmost prospect pit near the southern boundary of the WSA, in Utah, contained 0.002 oz/ton gold.

Geology: The study area is located on the Nevada-Utah border adjacent to Beaver Dam State Park in Nevada and Pine Park State Park in Utah. Slightly to moderately tilted volcanic rocks of Miocene age, related to the nearby Caliente caldera complex (Noble and McKee, 1972; Ekren and others, 1977) are exposed in the area.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 9,049 acres that constitute the balance.

References:

Conrad, J.E., King, H.D., Blank, H.R., Murphy, G.P., and Ryan, G.S., 1990, Mineral resources of the Cougar Canyon Wilderness Study Area, Lincoln County, Nevada, and Washington County, Utah: U.S. Geological Survey Open-File Report, 15 p.

Cook, E.F., 1960, Geologic map of Washington County, Utah, (1:125,000), supplement to the geologic atlas of Utah, Washington County: Utah Geological and Mineralogical Survey Bulletin 70, 119 p.

Ekren, E.B., Orkild, P.P., Sargent, K.A., and Dixon, G.L., 1977, Geologic map of Tertiary rocks, Lincoln County, Nevada: U.S. Geological Survey Miscellaneous Investigations Map I-1041, scale 1:250,000.

Molenaar, C.M., and Sandberg, C.A., 1983, Petroleum potential of wilderness lands in Utah, *in* Petroleum potential of wilderness lands in the western United States: U.S. Geological Survey Circular 902 A-P, p. K1-K14.

Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: Reno, Nevada, unnumbered pages.

Noble, D.C., and McKee, E.H., 1972, Description and K-Ar ages of volcanic rocks of the Caliente volcanic field, Lincoln County, Nevada, and Washington County, Utah: Isochron/West, no. 5, p. 17-24.

Oakes, Ed, Wedow, Helmuth, Poling, Robert, and Voelker, Al, 1981, The Depart- ment of Energy's energy-resource evaluation of wilderness study areas administered by the Bureau of Land Management, Cedar City district, Utah: Prepared for; Leasing Policy Development Office, Department of Energy, 317 p.

Ryan, G.S., 1989, Mineral investigation of a part of the Cougar Canyon Wilderness Study Area (UT-040-123/NV-050-166), Washington County, Utah and Lincoln County, Nevada: U.S. Bureau of Mines Open-File Report MLA 21-89.

Tschanz, C.M., and Pampeyan, E.H., 1970, Geology and mineral resources of Lincoln County, Nevada: Nevada Bureau of Mines and Geology Bulletin 73, 183 p.

EXPLANATION

Mineral resources of the Cougar Canyon (Tunnel Springs) Wilderness Study Area.

Name: Delamar Mountains
Area number: NV-050-177
Size (acres): 126,257

Status of mineral surveys: This area was not studied by the U.S. Geological Survey or the U.S. Bureau of Mines.

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): There is low potential for oil and gas in the Paleozoic rocks that underlie the area. The area is in the overthrust belt, and as of 1988, parts of the area were under lease by several different oil companies and private parties for oil and gas (Nevada Mining Association, 1988). Low potential also exists for deposits of silica, lime, and perlite in the area. The presence of the collapse caldera along the northeastern part of the study area may be a favorable locus for gold, mercury, lithium, and uranium mineralization; and the area is judged to have low potential for these and associated metallic resources.

Mining activity: Gold prospecting first occurred within the Delamar Mountains, and this study area, in the early 1890's; production was from cherty and vuggy quartz in quartzite breccia and bedding planes. The WSA contains several prospects for gold, silver, and manganese with no recorded production. However, the Delamar Mining district, 6 miles to the north, contains at least 40 mines, prospects and workings, including the Delamar mine, one of the largest historical gold producers in Nevada. This area has experienced some mineral exploration within the last year by at least five major mining companies.

Current exploration includes the location of at least 22 lode claims in the southeast corner of the WSA, and an additional 16 lode claims outside the southeast corner of the WSA (July 1989 BLM records).

Minor sand and gravel production has occurred from at least one pit within the WSA. Most of the WSA has been leased for oil and gas. There are no known geothermal energy leases.

Geology: The western and southern parts of the study area consist of Paleozoic sedimentary rocks, including dolomite, limestone, shale, siltstone, and quartzite. The northern and central parts of the area consist of welded and non-welded silicid ash flow tuffs with interbedded air fall tuffs and local volcanic-derived sedimentary beds. The northeast part of the study area includes the margin of a collapse caldera that has associated rhyolite plugs and is partially filled with Tertiary basalt flows. Alluvial deposits are found in low-lying areas and along drainages (Barton and Day, 1984).

Recommendations: The presence of the collapse caldera may merit further work to determine if there is any significant gold, mercury, lithium, or uranium mineralization in the area, especially in view of the fact that there are reactive sedimentary rocks that are potential hosts for mineral deposits. Because of this, the wilderness study area should be studied as part of a comprehensive mineral survey by the Bureau of Mines and Geological Survey.

References:

Barton, H.N., and Day, G.W., 1984, Reconnaissance geochemistry of the Delamar Mountains Bureau of Land Management Wilderness Study Area (NV-050-0177), Lincoln County, Nevada: U.S. Geological Survey Open-File Report 84-360, 46 p.

Bureau of Land Management, 1979, Initial inventory decisions Public Lands administered by BLM Nevada: U.S. Department of the Interior, Bureau of Land Management, p. 306.

Callaghan, Eugene, 1937, Geology of the Delamar District, Lincoln County, Nevada: Nevada University Bulletin v. 31, no. 5, 69 p.

Ekren, E.B., Orkild, Paul, Sargent, K.A., and Dixon, G.L., 1977, Geologic map of Tertiary rocks, Lincoln County, Nevada: U.S. Geological Survey Miscellaneous Field Investigations Map I-1041, scale 1:250,000.

Great Basin GEM Joint Venture, 1983, Delamar Mountains/Evergreen G-E-M Resources Area (GRA NO. NV-25) Technical Report (WSA NV 050-177, 050-01R-16A, 050-01R16-B, and 050-01R016C), 38 p.

McHugh, J.B., and Ficklin, W.H., 1984, A hydrogeochemical survey in Clover, Delamar, Meadow Valley, and Mormon Mountains, Lincoln County, Nevada: U.S. Geological Survey Open-File Report 84-354, 21 p.

Nevada Mining Association, 1988, Nevada BLM wilderness study areas mineral potential handbook: Nevada Mining Association, One East First Street, Reno, Nevada.

Tschanz, C.M., and Pampeyan, E.H., 1961, Preliminary Geologic Map of Lincoln County, Nevada: U.S. Geological Survey Mineral Investigations Field Studies Map MF-206.

Tschanz, C.M., and Pampeyan, E.H., 1970, Geology and mineral deposits of Lincoln County, Nevada: Nevada Bureau of Mines Bulletin 73, 187 p.

U.S. Bureau of Land Management, 1983, Delamar Mountains/ Evergreen G-E-M Resources Area (GRA no. NV-25) Technical Report, Contract YA-554-RFP2-1054, prepared by Great Basin GEM Joint Venture, 251 Ralston Street, Reno, Nevada 89503.

EXPLANATION

Mineral resources of the Delamar Mountains Wilderness Study Area.

Name:	Desatoya Mountains
Area number:	NV-030-110
Size (acres):	51,262 of which 43,053 were studied at the request of the U.S. Bureau of Land Management.
Status of mineral surveys:	Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (McKee and others, 1987).
Identified mineral resources (known):	No mineral resources have been identified in the Wilderness Study Area. Deposits of sand and gravel available for local consumption only do exist in the area. There are no mines with recorded production near the area. Minerals that are known to occur in the area are gold, silver, and barite.
Mineral resource potential (undiscovered):	An area that includes a tributary of Topia Creek on the east edge of the study area is assigned a moderate potential for undiscovered gold and silver resources. In the northern part of the study area and in the Rock Creek and Gold Basin claim areas a low resource potential for undiscovered gold and silver is indicated.
Mining activity:	None.
Geology:	The study area is underlain by a thick sequence of rhyolite welded tuffs and intrusive rocks mostly of Oligocene and (or) Miocene age (see appendix for geologic time chart). These volcanic and intrusive rocks are the products of a volcano that collapsed to form a large caldera located in the central part of what is now the Desatoya Mountains. This caldera, which formed about 24 million years ago, was subsequently filled with volcanic material before being greatly modified by basin and range faulting and by erosion.
Recommendations:	There is some interest in minerals in this area. Samples taken for the GEM evaluation and the mineral evaluation done by the U.S. Bureau of Mines indicate the presence of gold and silver. Further testing and evaluation has been recommended by Phelps Dodge and ASARCO as well as the U.S.Bureau of Mines. In addition, as only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 8,209 acres that constitute the balance.

References:

Benjamin D.A., 1986, Mineral Resources of the Desatoya Mountains Study Area, Churchill and Lander Counties, Nevada: U.S. Bureau of Mines Open File Report MLA 70-86, 28 p.

McKee, E. H., Barton, H. N., Conrad, J. E., Ponce, D. A., and Benjamin D.A., 1987, Mineral Resources of the Desatoya Mountains Wilderness Study Area, Churchill and Lander Counties, Nevada: U.S. Geological Survey Bulletin 1727-A, 15 p.

Stager H.K., 1977, Geology and Mineral Deposits of Lander, County, Nevada: Nevada Bureau of Mines and Geology Bulletin 88, 106 p.

Vanderburg W.O., 1940, Reconnaissance of Mining Districts in Churchill County, Nevada: U.S. Bureau of Mines Information Circular 7093, 57 p.

Wilden R. and Speed R.C., 1974, Geology and Mineral Deposits of Churchill, County, Nevada: Nevada Bureau of Mines and Geology Bulletin 83, 95 p.

_____1983, Desatoya Mountains GEM Resources Area (GRA No. NV-06) Technical Report (WSA NV 030-110), prepared for U.S. Bureau of Land Management, 30 p.

Mineral resources of the Desatoya Mountains Wilderness Study Area.

Explanation, mineral resources of the Desatoya Mountains Wilderness Study Area.

Name:	Disaster Peak
Area number:	OR-003-153/NV-020-859
Size (acres):	30,490 of which 30,195 were studied at the request of the U.S. Bureau of Land Management.
Status of mineral surveys:	Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Minor and others, 1988).
Identified mineral resources (known):	No mineral resources have been identified in the Wilderness Study Area. Small sand and gravel deposits do exist in the area, but the utilization would be only for local construction. In the vicinity of The Granites, southwest of Disaster Peak, are several prospect pits and the remains of two small mills. In 1986, several samples taken by the Bureau of Mines contained more than .1 ounce gold per ton. Minerals known to occur in the area are gold, silver, copper, lead, and lithium.
Mineral resource potential (undiscovered):	There is high and low potential for gold resources in quartz veins in the southern part and low potential for epithermal gold, silver, mercury, and uranium resources in the northeastern part of the study area. The study area has no potential for sand and gravel, oil and gas, or geothermal energy resources.
Mining activity:	July 1989 BLM records show 142 mining claims in or adjacent to the area. No mining companies are currently involved in active exploration programs in this area. Amselco and McDermitt Mines abandoned their exploration programs on claims in and adjacent to the area in 1987.
Geology:	The southern part of the study area is underlain by Cretaceous granitic rocks. An approximately flat-lying sequence of Tertiary volcanic and pyroclastic flows unconformably onlaps the granitic rocks and is exposed within most of the remainder of the study area. The Long Ridge caldera, located just east of the study area, is a collapse structure resulting from the eruption of an ash-flow tuff that forms the top of the flow sequence. The caldera is filled largely by tuffaceous sedimentary rocks. Numerous arcuate, north- to northeast-striking caldera ring faults displace rocks in and near the northeastern part of the study area. Younger, north-northwest-striking normal faults that have large displacements cut rocks west of the caldera in the study area.
Recommendations:	Recent evaluations of this area indicate there may be some potential for the discovery gold resources on the southern and eastern boundaries. More detailed examinations of the area are recommended.

References:

Conners R.A, Robinson M.L., Bukofski J.F., Meyer W.T., and Howarth R.J., 1982, Geochemical and geostatistical evaluation Wilderness Study Areas, Winnemucca District, Northwest Nevada: Barringer Resources, Inc., U.S. Bureau of Land Management contract no. YA-553-CT1-1096 5 VOL.

Leszcykowski A.M., 1987, Mineral resources of the Disaster Peak Study Area, Harney and Malheur Counties, Oregon and Humboldt County, Nevada: U.S. Bureau of Mines Open File Report MLA 65-87, 17 p.

Minor, S. A., Turner, R. L., Plouff, Donald, and Leszcykowski A.M., 1988, Mineral resources of the Disaster Peak Wilderness Study Area, Harney and Malheur Counties, Oregon, and Humboldt County, Nevada: U.S. Geological Survey Bulletin 1742-A, 18 p.

Wilden R., 1959, Geology and mineral deposits of Humboldt County, Nevada: Nevada Bureau of Mines and Geology Bulletin 59, 145 p.

Mineral resources of the Disaster Peak Wilderness Study Area.

Explanation, mineral resources of the Disaster Peak Wilderness Study Area.

Name: Dry Valley Rim
Area number: CA-020-615
Size (acres): 93,205 of which 54,480 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Diggles and others, 1988a).

Identified mineral resources (known): No metallic resources are identified. The Red Rock and Willow Springs areas contain 85 million tons of altered basalt containing amygdules that host an inferred subeconomic resource of zeolites. More than 50 percent of this basalt consists of amygdules filled with chabazite (a zeolite mineral).

The Broken Shovel claims, located along the southeast boundary of the study area, contain a 100,000-ton occurrence of perlite. While usable for lightweight aggregate, the deposit is too small for economic production. However, if considered for perlite production with other nearby deposits, this occurrence could become a subeconomic resource.

Montmorillonitic clays are present in alluvial sediment in the Capricorn claims adjacent to but outside the study area. Alluvial sediments contain more than 30 percent (volume) clays.

Mineral resource potential (undiscovered): Amygdule-rich basalt that crops out in the Red Rock Canyon and Willow Springs areas has moderate resource potential for zeolites. The areas of alteration that contain the zeolites are proximal to a north-trending fault that probably controlled the movements of alteration fluids. The quality of the zeolites around Red Rock Canyon and west of Willow Springs may be adequate for use as an absorbent in animal husbandry.

The area of silicic volcanic rocks around the Broken Shovel claims has low resource potential for perlite. The perlite is hosted in displaced blocks of what possibly originated as a rhyolite flow-dome complex.

Montmorillonitic clay is present in alluvial sediment east of Red Rock Canyon at the Capricorn claims area east of the study area. This material is not suitable as a pozzolan but may qualify as fuller's earth, which is used as absorbents and for bleaching oils. The clay occurrence, however, does not extend into the study area.

Mining activity: The wilderness study area is not in a mining district and no mining activity has been recorded. There are no current mining claims in the wilderness study area according to October, 1988, U.S. Bureau of Land Management records.

Geology: The Dry Valley Rim Wilderness Study Area is underlain by a 17-mi-long, north-trending fault block. Rocks in the study area are mostly middle Miocene andesite, andesitic lahar deposits and basalt and include minor amounts of rhyolitic ash-flow tuff. The oldest rocks in the study area are andesite flows and lahar deposits, commonly intercalated with olivine basalt. Rhyolite ash-flow tuff and lithic tuff are exposed in the fault scarp of the central part of Dry Valley Rim stratigraphically above the andesite. The rhyolite tuff is locally zeolitic. Olivine basalt flows cap the western dip slope of the study area. The major structure in the study area is the normal fault scarp that forms Dry Valley Rim.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 38,720 acres that constitute the balance.

References:

Bonham, H.F., 1969, Geology and mineral deposits of Washoe and Storey Counties, Nevada: Nevada Bureau of Mines Bulletin 70, 140 p.

Diggles, M.F., Batatian, L.D., and Dellinger, D.A., 1986, Geologic map of the Dry Valley Rim Wilderness Study Area, Lassen County, California and Washoe County, Nevada: U.S. Geological Survey Open-File Report 86-83, scale, 1:48,000.

Diggles, M.F., Dellinger, D.A., and Batatian, L.D., 1989, Geologic map of the Skedaddle Mountain Wilderness Study Area, Lassen County, California, and Washoe County, Nevada: U.S. Geological Survey Miscellaneous Field Studies Map MF-2006, scale 1:48,000.

Diggles, M.F., Frisken, J.G., Plouff, Donald, and Linne, J.M., 1988a, Mineral resources of the Dry Valley Rim Wilderness Study Area, Washoe County, Nevada, and Lassen County, California: U.S. Geological Survey Bulletin 1706-D, 17 p.

Diggles, M.F., Frisken, J.G., Plouff, Donald, Munts, S.R., and Peters, T.J., 1988b, Mineral resources of the Skedaddle Mountain Wilderness Study Area, Lassen County, California, and Washoe County, Nevada: U.S. Geological Survey Bulletin 1706-C, 27 p.

Lefond, S.J., ed., 1983, Industrial minerals and rocks, 5th edition, vol. 2: New York, New York, American Institute of Mining, Metallurgical, and Petroleum Engineers, Inc., p. 723-1446.

Lincoln, F.C., 1923, Mining districts and mineral resources of Nevada: Nevada Newsletter Publishing Company, 280 p.

Linne, J.M., 1987, Mineral resources of the Dry Valley Rim study area, Washoe County, Nevada and Lassen County, California: U.S. Bureau of Mines Open-File Report MLA 18-87, 18 p.

Mondale, K.D., Mumpton, F.A., and Aplan, F.F., 1978, Beneficiation of natural zeolites from Bowie, Arizona: a preliminary report in Sand, properties, use: Oxford, Pergammon Press, p. 527-537.

Mumpton, F.A., 1983, Commercial utilization of natural zeolites, *in* Lefond, S.J., ed., Industrial minerals and rocks, 5th edition, vol. 2: New York, New York, American Institute of Mining, Metallurgical, and Petroleum Engineers, Inc., p. 1418-1431.

Munts, S.R., and Peters, T.J., 1987, Mineral resources of the Skedaddle study area, Lassen County, California and Washoe County, Nevada: U.S. Bureau of Mines Open-File Report MLA 22-87, 52 p.

Mineral resources of the Dry Valley Rim Wilderness Study Area.

Explanation, mineral resources of the Dry Valley Rim Wilderness Study Area.

Name: East Fork High Rock Canyon
Area number: CA-020-914/NV-020-006A
Size (acres): 52,000 of which 33,460 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Ach and others, 1987).

Identified mineral resources (known): No mineral resources have been identified within the wilderness study area.

Mineral resource potential (undiscovered): Two areas in the northern and eastern part of the study area have moderate mineral resource potential for gold, silver, and mercury in epithermal deposits. One area along the west boundary of the study area has moderate mineral resource potential for zeolite minerals. A low potential also exists for geothermal energy resources, and potential for oil and gas is unknown.

Mining activity: No mining districts are situated in or near the wilderness study area. There has been no known prospecting activity or mineral production from the wilderness study area, however one pit was found dug in barren rock. There are no current mining claims in the wilderness study area according to July 1989, U.S. Bureau of Land Management records.

Geology: There are no pre-Miocene basement rocks exposed in the study area. The basement is assumed to be composed of granites and metamorphosed sedimentary rocks. If this is the case, there is no oil and gas resource potential. The oldest exposed rock unit is the middle Miocene Soldier Meadow Tuff. This tuff is overlain by a nonwelded air-fall tuff. The two tuffs have been intruded by rhyolite and are overlain by sedimentary rocks formed in lake-bottom settings. There are several dark basalt caps in the central part of the study area. Ring fractures formed during the eruption of the tuffs may have provided a "plumbing system" for ore-carrying and zeolite-forming hydrothermal fluids in the past and may provide avenues for geothermal fluids now.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 18,540 acres that constitute the balance.

References:

Ach, J.A., Plouff, Donald, and Turner R.L., Schmauch, S.W., 1987, Mineral resources of the East Fork High Rock Canyon wilderness study area, Washoe and Humboldt Counties, Nevada: U.S. Geological Survey Bulletin 1707-B, 14 p.

Bonham, H.F., 1969, Geology and mineral deposits of Washoe and Storey Counties, Nevada, *with a section on* industrial rock and mineral deposits by K.G. Papke: Nevada Bureau of Mines Bulletin 70, 14 p.

Connors, R.A., Robinson, M.L., Bukofski, J.F., Meyer, W.T., and Howarth, R.J., 1982, Geochemical and geostatistical evaluation wilderness study areas, Winnemucca district, northwest Nevada: prepared for the BLM under contract no. YA-553-CT1-1096, by Barringer Resources, Inc., 72 p. and appendixes.

Ferguson, H.G., 1944, The geology of Nevada ore deposits: University of Nevada Bulletin, v. 38, no. 4, 110 p.

Greene, R.C., and Plouff, Donald, 1981, Location of a caldera source for the Soldier Meadow Tuff, northwestern Nevada, indicated by gravity and aeromagnetic data, summary: Geological Society of America Bulletin, v. 92, no. 1, part 1, p. 4-6.

Korringa, M.K., 1973, Linear vent area of the Soldier Meadow Tuff, an ash-flow sheet in northwestern Nevada: Geological Society of America Bulletin, v. 84, p. 3849-3865.

Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: Reno, Nevada, unnumbered pages.

Noble, D.C., McKee, E.H., Smith, J.G., and Korringa, M.K., 1970, Stratigraphy and geochronology of Miocene volcanic rocks in northwestern Nevada: U.S. Geological Survey Professional Paper 700-D, p. D23-D32.

Overton, T.D., 1947, Mineral resources of Douglas, Ormsby, and Washoe Counties, Nevada: Nevada University Bulletin, v. 41, no. 9, 46 p.

Ransome, F.L., 1909, Notes on some mining districts in Humboldt County, Nevada: U.S. Geological Survey Bulletin 414, 75 p.

Schilling, J.H., 1969, Metal mining districts of Nevada: Nevada Bureau of Mines Map 37, scale 1:1,000,000.

Schmauch, S.W., 1986, Mineral resources of the East Fork High Rock Canyon study area, Humboldt and Washoe Counties, Nevada: U.S. Bureau of Mines Open-File Report MLA 60-86, 9 p.

Stewart, J.H., and Carlson, J.E., 1976, Cenozoic rocks of Nevada: Nevada Bureau of Mines and Geology Map 52, scale 1:1,000,000.

Wilden, Ronald, 1964, Geology and mineral deposits of Humboldt County, Nevada: Nevada Bureau of Mines and Geology Bulletin 59, 154 p.

Mineral resources of the East Fork High Rock Canyon Wilderness Study Area.

Explanation, mineral resources of the East Fork High Rock Canyon Wilderness Study Area.

Name: El Dorado
Area number: NV-050-423
Size (acres): 12,290

Status of mineral surveys: This wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Conrad and others, 1990).

Identified mineral resources (known): There are inferred subeconomic resources of gold and silver on the Paul and Bel claims; inferred subeconomic resources of silver, lead, and zinc on the Big Horn claims; and inferred subeconomic resource of gold, silver, copper, lead, and zinc on the Montezuma patented claims; all on the southern and southeastern part of the WSA (Causey and Miller, 1988). The study area also contains sand and gravel resources useful for local road construction.

Mineral resource potential (undiscovered): There is moderate to high potential for gold, silver, copper, lead, zinc, and mercury in the southeastern part of the study area. Low to moderate potential for these metals exists throughout the rest of the study area. A uranium occurrence reported by Garside (1973) suggests that there is low resource potential for uranium in Precambrian rocks exposed in the southeastern part of the study area. Sand and gravel occur mostly in small deposits suitable for local use; there is low potential for significant resources of these commodities. There is no potential for oil and gas resources.

Mining activity: The WSA is on the edge of the Eldorado mining district. It includes parts of two separate patented claim groups (Montezuma - MS 3966 and Techatticup Consolidated - MS 3973 A and B). No production of gold, silver, copper, lead, zinc, or mercury has come from the WSA, but at least $6 million worth of these metals has been recovered from mines nearby. Unrecorded amounts of sand and gravel have been mined for road metal from the WSA.

Recent exploration has been done by Exxon, Placer Amex, and Homestake. Mill tailings from the Techatticup Mill were leached by Canyon Mining Company in 1988. Nine claim groups in the WSA were examined by Causey and Miller (1988). Activity was minimal with five of the groups being abandoned.

July 1989 BLM records show 80 lode and 19 placer claims in the WSA.

Geology: The El Dorado area is underlain by Miocene volcanic rocks faulted against Precambrian gneiss and schist. These rocks are intruded by granitic rocks along the south boundary of the area. The rocks are cut by numerous north-trending faults. Dikes of varying composition also cut the rocks and have intruded along faults.

Recommendations: No further work is recommended.

References:

Causey, J. D., and Miller, M. S., 1988, Mineral resources of the Eldorado study area, Clark County, Nevada: U.S. Bureau of Mines Open File Report MLA 44-88, 48 p.

Conrad, J.E., Nowlan, G.A., and Causey, J.D., 1990, Mineral resources of the El Dorado and Ireteba Peaks Wilderness Study Areas, Clark County, Nevada: U.S. Geological Survey Open-File Report

Garside, L.J., 1973, Radioactive mineral occurrences in Nevada: Nevada Bureau of Mines and Geology Bulletin 81, 121 p.

Great Basin GEM Joint Venture, 1983, Eldorado Mountains G-E-M resources area (GRA no. NV-37) technical report (WSA's NV-050-0423 and 050-0438): Prepared for the U.S. Bureau of Land Management, contract YA-554-RFP2-1054, 33 p.

Hansen, S. M., 1962, The geology of the Eldorado mining district, Clark County, Nevada: University of Missouri Ph.D. dissertation, 262 p.

Hewett, D. F., Callaghan, Eugene, Moore, B. N., Nolan, T. B., Rubey, W. W., and Schaller, W. T., 1936, Mineral resources of the region around Boulder Dam: U.S. Geological Survey Bulletin 871, 197 p.

Longwell, C.R., Pampeyan, E.H., Bowyer, Ben, and Roberts, R.J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines and Geology Bulletin 62, 218 p.

Smith, P. L., and Tingley, J. V., 1983, A mineral inventory of the Esmeralda-Stateline Resource Area, Las Vegas District, Nevada: Nevada Bureau of Mines and Geology Open-file Report 83-11, 173 p.

Vanderburg, W. O., 1937, Reconnaissance of mining districts in Clark County, Nevada: U.S. Bureau of Mines Information Circular 6964, 81 p.

EXPLANATION

Mineral resources of the El Dorado Wilderness Study Area.

Name:	Evergreen
Area number:	NV-050-1R-16A/B/C
Size (acres):	2,834
Status of mineral surveys:	This area was not studied by the U.S. Bureau of Mines or the U.S. Geological Survey.
Identified mineral resources (known):	No mineral resources have been identified in the Wilderness Study Area.
Mineral resource potential (undiscovered):	There is no indication of mineral resource potential in the area. It is entirely covered by alluvium similar to that that covers hundreds of thousands of acres in this part of Nevada. Depth to bedrock with potential for metallic resources is unknown but probably great.
Mining activity:	July 1989 BLM mining claim records do not show any claims in or near the WSA. There is no known current exploration activity. The nearest claims are about eight miles away.
Geology:	The area is underlain primarily by Quaternary and recent unconsolidated alluvium. However, Tertiary tuffs and undifferentiated volcanics occur in the northern end of the study area and are similar to those in the Delamar mining district. There is probably older Tertiary age alluvium at some depth and Paleozoic dolomite at greater, but unknown, depth.
Recommendations:	Surface seismic reflection studies might reveal important data about depth to bedrock and other near surface structural features. The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

Barton, H.N., and Day, W.D., 1984, Reconnaissance geochemistry of the Delamar Mountains Bureau of Land Management Wilderness Study Area (NV 050-0177), Lincoln County, Nevada: U. S. Geological Survey Open File Report 84-360.

Bureau of Land Management, 1979, Initial inventory decisions Public Lands administered by BLM Nevada: U.S. Department of the Interior, Bureau of Land Management, p. 306.

Callaghan, Eugene, 1937, Geology of the Delamar District, Lincoln County, Nevada: Nevada University Bulletin v. 31, no. 5, 69 p.

Elevatorski, E.A., 1981, Disseminated/Replacement gold deposits: Minobras, p. 56.

Great Basin GEM Joint Venture, 1983, Delamar Mountains/Evergreen G-E-M Resources Area (GRA NO. NV-25) Technical Report (WSA NV 050-177, 050-01R-16A, 050-01R16-B, and 050-01R016C), 38 p.

Tschanz, C.M., and Pampeyan, E.H., 1961, Preliminary Geologic Map of Lincoln County, Nevada: U.S. Geological Survey Mineral Investigations Field Studies Map MF-206.

EXPLANATION

Mineral resources of the Evergreen Wilderness Study Area.

Name:	Fandango
Area number:	NV-060-190
Size (acres):	40,940 of which 31,740 were studied at the request of the U.S. Bureau of Land Management.
Status of mineral surveys:	Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (John and others, 1987).
Identified mineral resources (known):	A small (200 tons of ore) zinc-lead-silver resource (Lead Pipe property, No. 1 on fig.) exists in the northeastern part of the study area. A disseminated gold occurrence associated with a jasperoid thrust breccia in the northeastern part of the study area (old CL claim group) was explored during 1983-86, but the occurrence was deemed uneconomic.
Mineral resource potential (undiscovered):	The Fandango Wilderness Study Area has several areas of high potential for gold resources, and several small areas of low and moderate potential for silver, lead, and zinc resources. In addition, there is low potential for petroleum, natural gas, uranium, and geothermal energy.
Mining activity:	There are no patented claims inside the study area and as of 7/89 there are also no unpatented claims on file with the BLM. The only reported production in the study area came from the Lead Pipe property where some high-grade lead ore was produced during WW 1. The lead Pipe property has three adits that were driven into slightly silicified carbonate rock at three different levels. During 1983-86, Long Lac Mineral Exploration, Inc., Reno, NV, explored the northeastern part of the study area for a disseminated gold deposit (Carlin-type). The initial exploration identified three areas with potential mineral resources of barium-zinc-lead-silver, zinc-lead-silver, and low-grade, large-tonnage gold and anomalous molybdenum. As of 3/89, the company had dropped the claim group because the primary target, the gold deposit, was determined to be uneconomic.
Geology:	The northern part of the Fandango Wilderness Study Area is underlain by Paloezoic and Mesozoic sedimentary rocks. Most of the sedimentary rocks are carbonate rocks, with minor quartzite, calcareous shale, siliceous shale, and siltstone. The southern part of the study area is underlain by middle Tertiary silicic volcanic rocks that are mainly ash-flow tuffs. Several ages and types of faults are present in the study area, including Mesozoic thrust faults and Cenozoic high-angle normal faults. The intersections of thrusts and high-angle normal faults served as important controls on localization of hydrothermal alteration and gold mineralization in the study area.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 9,200 acres that constitute the balance. Continued attention should be given to the northeastern part of the study area because improvements in mineral technology and/or metal prices could again make the area a development target.

References:

John, D.A., Nash, J.T., Plouff, Donald, and McDonnell, J.R., Jr., 1987, Mineral resources of the Morey and Fandango Wilderness Study Areas, Nye County, Nevada: U.S. Geological Survey Bulletin 1731-A, 19 p.

McDonnell, J.R., Jr., 1985, Mineral investigation of the Fandango (NV-060-190) and Morey (NV-060-191) Wilderness Study Areas, Nye County, Nevada: U.S. Bureau of Mines Open-File Report 61-85, 41 p.

Mineral resources of the Fandango Wilderness Study Area.

Explanation, mineral resources of the Fandango Wilderness Study Area.

Name:	Far South Egans
Area number:	NV-040-172
Size (acres):	53,224 of which 42,316 were studied at the request of the U.S. Bureau of Land Management.
Status of mineral surveys:	Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Hedlund and others, 1987).
Identified mineral resources (known):	No metallic-mineral resources or occurrences are known within the Far South Egans Wilderness Study Area. Industrial-mineral commodities such as carbonate rocks, high-silica quartzite, sand and gravel deposits, and perlite are present within and near the study area, but these area common materials of low unit value and generally require local markets to be economically exploited.
Mineral resource potential (undiscovered):	The northeastern part of the Far South Egans study area has moderate mineral resource potential for gold and molybdenum related to Tertiary intrusive or volcanic rocks. Moderate potential for cadmium, molybdenum, lead, and zinc exists in the southern part of the study area related to a faulted jasperoid vein. The rest of the study area has low potential for all metals. The energy resource potential for oil, gas, and coal within the study area is low, based on the exposed rock units. The adjacent basins, such as the White River and Cave Valleys, have a moderate potential for oil and gas reservoir rocks in the subsurface (Sandberg, 1983). If the surface rocks in the study area have been thrust over these more favorable source rocks, the resource potential for oil and gas may be higher; however, because the underlying rocks are unknown, the potential for oil and gas in the underlying rocks is classed as unknown.
Mining activity:	There are no mining districts, mines, prospects, or current mining claims in the study area. On the south side of Trough Spring Canyon (south of the study area), two prospect pits expose a vein along a northeast-striking fault.
Geology:	The Egan Range consists of a coextensive series of eastward-tilted fault blocks. Within the study area, as much as 19,000 ft of tilted Paleozoic (see geologic time chart on the last page of this report) strata are locally overlain by both tilted and flat-lying mid- and early Tertiary volcanic rocks. The structural features of the study area are controlled by the Shingle Pass fault to the north, by the Trough Spring fault on the south, and by a major range-front fault largely concealed by piedmont-slope fan deposits along the eastern margin of White River Valley. Pleistocene lacustrine deposits younger than the Cave Valley Formation fill Cave Valley on the east.

Recommendations:	As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 10,908 acres that constitute the balance.
References:	Hedlund, D.C., Davies, R.C., Hovorka, D.S., Blank, H.R., Jr., and Tuftin, S.E., 1987, Mineral resources of the Far South Egans Wilderness Study Area, Lincoln and Nye Counties, Nevada: U.S. Geological Survey Bulletin 1728-C, 11 pages.

Mineral resources of the Far South Egans Wilderness Study Area.

Explanation, mineral resources of the Far South Egans Wilderness Study Area.

Name: Fish & Wildlife #1/2/3
Area number: NV-050-201/216/217
Size (acres): 50,334

Status of mineral surveys: This area was not studied by the U.S. Bureau of Mines or the U.S. Geological Survey.

Identified mineral resources (known): Along Highway 93, at least three sand and gravel pits in the study area and three adjacent to the east have been mined; three or more unmined sand and gravel material sites have been designated by the U.S. Bureau of Land Management in and near the study area. Arthur Henderson, part owner of Las Vegas Building Materials and Rock Products Limited reported (telephone conversation, 1989) that uncommon varieties (specific gravity, purity, and potential uses) of sand and gravel near the south end of the study area on the Newt Crumley and Mary Eleanor claim groups had exceptional properties for golf course sands and ballast. Mineral resources, especially sand and gravel for construction, probably will have an expanding market in the Las Vegas area.

Mineral resource potential (undiscovered): There are no known metallic or nonmetallic resources are known to occur within any of the three areas, and there are no indications that there are any undiscovered resources. Limestone and sand and gravel in the areas may be useable, but these commodities are abundant in the region, and other sources are closer to existing markets. There are no known oil and gas leases in any of the three areas, although the potential for petroleum is deemed by Sandberg (1983) to be moderate in the three areas. Muffler (1979) shows no evidence of potential for geothermal resources in any of the areas.

Mining activity: The Lead King Mine, in the southeast of section 6, T. 19 S., R. 63 E., about two miles south of the study area, produced two railroad carloads of ore containing 59 percent lead in galena and cerrussite from a shear zone 1 foot to 4 feet thick in Monte Cristo Limestone (Longwell and others, 1965, p. 180).

High-calcium limestone and lime are being produced about three miles east of the south end of the study area. Limestone has been mined in this vicinity for decades; approximately 500,000 tons of limestone were being mined from the Crystal Pass Member of the Sultan Limestone near the study area in the 1930's (Longwell and others, 1965, p. 205).

July 1989 BLM records show one lode mining claim, an associated millsite location, and 98 placer mining claim locations were active in the WSA. Topographic maps showed one prospect pit in foothills near the south end of the study area.

In 1983, federal oil and gas leases covered most of the study area (Great Basin GEM Joint Venture, 1983).

Geology: The geology of the study area consists of a section of Paleozoic (Devonian through Permian) sedimentary stratified rocks. The dominant rock types in the area are limestone and dolomite of the Sultan, Monte Cristo, and Bird Spring formations. Interbedded in within these units are lesser amounts of sandstone, shale, and chert. At the north end of area No. 1, there are Tertiary tuffaceous sediments and tuff. Most of the total area of the three tracts is covered with alluvium and colluvium.

Recommendations: Market studies and technical data for limestone, dolostone, and sand and gravel in the study area should be developed. Thorium in small, uneconomic amounts in sediments near the north end of the study area should be evaluated both as a placer source and as a guide to lode deposits. Likewise, other heavy elements, such as chromium, cobalt, and antimony occur in small, uneconomic amounts in sediments near the north and south end of the study area and should be evaluated as guides to lode deposits (see Qualheim, 1978; Cook and Fay, 1982). Broad aeromagnetic anomalies (see Aero Service Division, 1979) in the vicinity of the study area may be pertinent to oil and gas exploration and should be part of a mineral resource evaluation. The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

Aero Service Division, 1979, Airborne Gamma-Ray Spectrometer and magnetometer survey, Las Vegas Quadrangle (Arizona, California, Nevada), Williams Quadrangle (Arizona), Prescott Quadrangle (Arizona), and Kingman Quadrangle (Arizona, California, Nevada), Final Report, volumes I and II: Houston, Tx, Western Geophysical Company of America, for U.S. Department of Energy, Open-File report GJBX 59(79).

Bowyer, Ben, Pampeyan, E. H., and Longwell, C. R., 1958, Geologic map of Clark County, Nevada: U.S. Geological Survey Miscellaneous Field Investigations Map MF-138, scale 1:200,000.

Bureau of Land Management, 1988, Draft environmental impact statement, Preliminary wilderness recommendations for Nevada contiguous lands: Department of Interior, Bureau of Land Management, Ely, Las Vegas, and Winnemucca Districts, 291 p, unpaginated section of maps.

Cook, J.R., and Fay, W.M., 1982, Data report: western United States, National Uranium Resource Evaluation Program, hydrogeochemical and stream sediment reconnaissance: Aiken, SC, E.I. du Pont de Nemours and Company, Savannah River Laboratory, for U.S. Department of Energy, Open-File report GJBX 132(82), 33 p.

Ekren, E.B., Orkild, Paul, Sargent, K.A., and Dixon, G.L., 1977, Geologic map of Tertiary rocks, Lincoln County, Nevada: U.S. Geological Survey Miscellaneous Field Investigations Map I-1041, scale 1:250,000.

Great Basin GEM Joint Venture, 1983, Arrow Canyon/Las Vegas Range G-E-M Resources Area (GRA NO. NV-29) Technical Report (WSA's NV 050-0215, 050-0216, and 050-0217): Reno, Nevada, Great Basin GEM Joint Venture, Open-File report for U.S. Bureau of Land Management, 34 p.

Longwell, C.R., Pampeyan, E.H., Bowyer, Ben, and Roberts, R.J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines, Bulletin 62, 218 p.

Muffler, L.J.P., ed., 1979, Assessment of geothermal resources of the United States--1978: U.S. Geological Survey Circular 790, 163 p., maps in separate case.

Nevada Mining Association, 1988, Nevada BLM wilderness study areas mineral potential handbook: Nevada Mining Association, One East First Street, Reno, NV.

Qualheim, B.J., 1978, Hydrogeochemical and stream sediment reconnaissance basic data report for Las Vegas NTMS Quadrangle, Arizona, California, and Nevada: Livermore, CA, Lawrence Livermore Laboratory, for U.S. Department of Energy, Open-File report GJBX-123(78), 42 p. plus two appendixes.

Sandberg, C. A., 1983, Petroleum potential of wilderness lands in Nevada: U.S. Geological Survey Circular 902-H, 11 p.

Tschanz, C.M., and Pampeyan, E.H., 1970, Geology and mineral deposits of Lincoln County, Nevada: Nevada Bureau of Mines Bulletin 73, 187 p.

EXPLANATION

Mineral resources of the Fish and Wildlife #1/2/3 Wilderness Study Areas.

Name:	Five Springs
Area number:	CA-020-609
Size (acres):	48,460
Status of mineral surveys:	This area was not studied by the U.S. Geological Survey or the U.S. Bureau of Mines.
Identified mineral resources (known):	The only known mineral commodity in the wilderness study area is about 2,000,000 tons of clay at the Hillside deposit in the Stoney Creek drainage in T. 31 N., R. 16 E., Sec. 3. The deposit was investigated and rejected as a potential source of aluminum in 1944. No records of investigations of other potential uses of the clay are known.
Mineral resource potential (undiscovered):	There is high mineral resource potential for clay and low mineral resource potential for diatomite deposits in the wilderness study area. The area probably does not contain any metallic mineral commodities and is also unlikely to have geothermal energy resources.
Mining activity:	The wilderness study area is not in a mining district, contains no current claims or leases, according to 1988 U.S. Bureau of Land Management records, and has had no known mineral production.
Geology:	The area is underlain by late Tertiary and minor Quaternary basaltic rocks with some Tertiary Lake bed deposits and Quaternary alluvium in the southern part of the area.
Recommendations:	The type, quality, and potential uses for the clay from the Hillside deposit should be investigated as part of a comprehensive mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines. References used (see below) did not indicate whether the lake beds might contain diatomite. A further literature search would probably provide this information. If indicated in the literature, field work to determine the extent and quality of diatomite might be warranted.

References:

Gay, T.E., 1966, Economic mineral deposits of the Cascade Range, Modoc Plateau, and Great Basin region of northeastern California in Geology of northern California: California Division of Mines and Geology Bulletin 190, p. 104-107.

Lydon, P.A., Gay, T.E., Jr., and Jennings, C.W., compilers, 1960, Westwood (Susanville) sheet: California Division of Mines and Geology Geologic Map of California, scale 1:250,000.

U.S. Bureau of Land Management, 1984, Preliminary wilderness recommendations, Eagle Lake-Cedarville study areas: U.S. Bureau of Land Management Draft Environmental Impact Statement.

_____1988, Geographic index (of) all claims.

U.S. Bureau of Mines, 1989, Mineral property file (006-035-0121) on the Hillside clay deposit: Available at the U.S. Bureau of Mines, Western Field Operations Center, E. 360 Third Avenue, Spokane, WA 99202.

_____1989, Mineral Industry Location System (MILS).

EXPLANATION

H/C	Geologic terrane having high mineral resource potential for clay with certainty level B as well as identified resources of clay
L/B	Geologic terrane having low mineral resource potential for diatomite with certainty level B

Mineral resources of the Five Springs Wilderness Study Area.

Name:	Fortification Range
Area number:	NV-040-177
Size (acres):	41,615
Status of mineral surveys:	This area was not studied by the U.S. Bureau of Mines or the U.S. Geological Survey.
Identified mineral resources (known):	No mineral resources have been identified in the Wilderness Study Area.
Mineral resource potential (undiscovered):	The mineral resource potential of the area is largely unknown. Ash-flow tuff and tuffaceous sedimentary rocks suggest that a low resource potential for perlite, epithermal gold-silver deposits and perhaps diatomite may be present. The underlying, and largely unexposed sequence of Paleozoic rocks suggests that there is low potential for oil and gas as source and reservoir rocks may be present, as do existing oil and gas leases.
Mining activity:	The Spring Valley Mine lies about one mile east of the WSA. One mining claim has been recorded within the WSA, but is not currently (July 1989) active. Six oil and gas leases cover 31,873 acres in the area.
Geology:	Dominantly gently dipping tuffaceous sedimentary rocks and ash-flow tuff rest unconformably on Paleozoic limestone and shale. The name Fortification Range is derived from the high cliffs of erosion-resistant ash-flow tuff. Several north-south trending normal faults slice the range into narrow bands. The detailed geology of the range is little known.
Recommendations:	Because so little is know about the resource potential of the area, and since the geology suggests that mineral resources may exist, this area should be studied as part of a comprehensive mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines.
References:	Best, M.G., Christiansen, E.H., and Blank, R.H., 1989, Oligocene caldera complex and calc-alkaline tuffs and lavas of the Indian Peak volcanic field, Nevada and Utah: Geological Society of America Bulletin, v. 101, no. 8, p. 1076–1090. Great Basin GEM Joint Venture, 1983, Fortification Range (WSA NV-040-177) G-E-M Resources Area: Technical report prepared for the U.S. Bureau of Land Management (contract YA-553-RFP2-1054), GRA No. NV-15, 25 p. Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: Reno, Nevada, unnumbered pages.

Toth, M.I., Stoneman, R.G., Blank, H.R., Jr., and Gese, D.D., 1986, Mineral resources of the White Rock Range Wilderness Study Area, Lincoln County, Nevada, and Beaver and Iron Counties, Utah, Chapter B: U.S. Geological Survey Bulletin 1728-B, 14 p.

Toth, M.I., Stoneman, R.G., Blank, H.R., Jr., and Gese, D.D., 1987, Mineral resources of the Parsnip Peak Wilderness Study Area, Lincoln County, Nevada, Chapter D: U.S. Geological Survey Bulletin 1728-D, 13 p.

Tschanz, C.M., and Pampeyan, E.H., 1970, Geology and mineral deposits of Lincoln County, Nevada: Nevada Bureau of Mines and Geology Bulletin 73, 187 p.

EXPLANATION

Mineral resources of the Fortification Range Wilderness Study Area.

Name: Fox Mountain Range
Area number: NV-020-014
Size (acres): 75,404

Status of mineral surveys: This area has not been studied by the U.S. Bureau of Mines or the U.S. Geological Survey.

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area.

Extensive areas of rock and sand and gravel occur within the WSA. However, the distance to markets combined with the abundance of these commodities in the region prevent these materials from being classified as identified resources.

Mineral resource potential (undiscovered): The Fox Mountain Range has a moderate potential for gold-silver quartz-vein deposits along faults zones and dikes in metasedimentary and granitic rocks, a moderate potential for tungsten skarn deposits in metamorphosed limestone near granitic contacts, a low potential for lead-silver quartz-vein deposits in metasedimentary rocks, and a low potential for nickel and copper in gabbro. These types of deposits are known in the range, and the rocks and structures of the range are favorable for discovery of further deposits. A low potential exists for the development of geothermal energy along faults on the margins of the range.

Mining activity: The Cottonwood Canyon mining district is in the WSA. Silver and antimony have been produced with tetrahedrite being the host mineral for the silver. In the southern part of the study area are two properties, the Garnet and the Nash, which have known tungsten values.

July 1989 BLM records show 63 claims in and near the WSA.

Geology: The Fox Mountain Range is a large east-tilted basin-and-range block bounded by major high-angle normal faults on the west side. It is composed of Mesozoic, and possibly Paleozoic, highly sheared, metasedimentary rocks intruded by Cretaceous granitic rocks. These rocks are overlain by a moderately thick sequence of Tertiary volcanic and sedimentary rocks.

Recommendations: The Fox Mountain Range is poorly known geologically, and extensive field studies are needed to better understand the mineral potential of the area. The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

Bonham, H.F. and Papke, K.G., 1969, Geology and Mineral Deposits of Washoe and Storey Counties, Nevada: Nevada Bureau of Mines and Geology Bull. 70, 140 p.

Overton, T.D., 1947, Mineral Resources of Douglas, Ormsby, and Washoe Counties: Nevada Bureau of Mines and Geology Bull. 46, 91 p.

EXPLANATION

Mineral resources of the Fox Mountain Range Wilderness Study Area.

Name: Gabbs Valley Range
Area number: NV-030-407
Size (acres): 79,600

Status of mineral surveys: This area was not studied by the U.S. Bureau of Mines or the U.S. Geological Survey.

Identified mineral resources (known): Manganese at the Ball Bearing mine.

Mineral resource potential (undiscovered): The Gabbs Valley Range study area has moderate potential for manganese and low to moderate potential for gold, silver, mercury and antimony. The area has low potential for lead, zinc, copper, iron, tungsten, and uranium and thorium. There is no potential for oil and gas resources.

Mining activity: The Ball Bearing manganese prospect, in the north part of the WSA, contains manganese near the end of a road with a cherry-stemmed WSA boundary. No production from the Ball Bearing prospect was reported as of 1959 (Trengrove, 1959, figure 1). A small amount of mercury has been produced northeast of the Ball Bearing prospect at the Poinsettia mine, from shear zones in andesite tuffs and flows (U.S. Bureau of Mines, 1965, p. 277).

Also noted is the Gabbs claim group (owned by Lacana) which covers a strong gold, silver, antimony, and mercury anomaly. Another claim group, the Paint Rock group, covers a strong gold, silver, and mercury anomaly associated with jasperoid.

July 1989 BLM records show at least 250 claims active in the study area, particularly in the southern half.

Geology: The Gabbs Valley Range is underlain mostly by volcanic rocks of Tertiary age that consist largely of rhyolitic ash-flow tuff and andesitic lava flows. Small intrusive stocks of Mesozoic and Tertiary age cut these rocks in several places in the study area. Volcanic and sedimentary rocks of Jurassic and Triassic age underlie a small area in the northern part of the study area.

Recommendations: The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

Ekren, E.B., and Byers, F.M., Jr., 1978a, Preliminary geologic map of the Luning NE Quadrangle, Nevada: U.S. Geological Survey Open-File Map OF 78-915, scale 1:48,000.

_____1978b, Preliminary geologic map of the Luning NW Quadrangle, Nevada: U.S. Geological Survey Open-File Map OF 78-916, scale 1:48,000.

_____1978c, Preliminary geologic map of the Luning SW Quadrangle, Nevada: U.S. Geological Survey Open-File Map OF 78-917, scale 1:48,000.

_____1978d, Preliminary geologic map of the Luning SE Quadrangle, Nevada: U.S. Geological Survey Open-File Map OF 78-918, scale 1:48,000.

Ekren, E.B., Byers, F.M., Jr., Hardyman, R.F., Marvin, R.F., and Silberman, M.L., 1982, Stratigraphy. preliminary petrology and some structural features of Tertiary volcanic rocks in the Gabbs Valley and Gillis Ranges, Mineral County, Nevada: U.S. Geological Survey Bulletin 1464, 54 p.

Flannaca, Mike, 1988, Geology of the Santa Fe gold-silver deposit, Mineral County, Nevada, in Shaddrick, D. R., Hunsaker, E. L., Hafen, P., and Buffa, R., Precious metal deposits of west - central Nevada: Society of Mining Engineers, p. 233-239.

Great Basin GEM Joint Venture, 1983, Gabbs Valley G-E-M Resources Area (GRA NO. NV-11) technical report (WSAs NV 030-407): Reno, Nevada, Great Basin GEM Joint Venture for U.S. Bureau of Land Management contract YA-554-RFP2-1054 Open-File Report, 33 p.

Ross, D.C., 1961, Geology and mineral deposits of Mineral County, Nevada: Nevada Bureau of Mines Bulletin 58, 98 p.

Trengove, R.R., 1959, Reconnaissance of Nevada manganese deposits: U.S. Bureau of Mines Report of Investigations 5446, 40 p.

U.S. Bureau of Mines, 1965, Mercury potential of the United States: U.S. Bureau of Mines Information Circular 8252, 376 p.

EXPLANATION

Mineral resources of the Gabbs Valley Range Wilderness Study Area.

Name:	Garrott Buttes
Area number:	NV-050-235
(Size acres):	11,835
Status of mineral surveys:	This area was not studied by the U.S. Bureau of Mines or the U.S. Geological Survey.
Identified mineral resources (known):	No mineral resources have been identified in the Wilderness Study Area.
Mineral resource potential (undiscovered):	The southern Virginia mountains, underlain by granitic and sedimentary rocks comprising the area to the east, contain deposits of beryllium which occur predominantly in pegmatites. The Garrot Buttes study area contains abundant pegmaties, similar to those rocks exposed in the east, therefore the resource potential for beryllium in the entire area is low to moderate. Less than 10,000 ounces of gold have been produced from the granitic rocks in the area. The resource potential for gold is low to moderate.
Mining activity:	No mining activity is known in the WSA. July 1989 BLM records show no active mining claims in the WSA.
Geology:	Four rock types are defined in this area: tuffaceous sediments, sand dune and beach deposits, metamorphic rocks, and granitic rocks. The eastern portion iof the study area borders on a western extension of a large metamorphic and granitic field.
Recommendations:	A detailed study of the area should be done to determine the thickness of the tuffaceous sediments and also whether or not the older granitic rocks extend under the entire area. Detailed geologic mapping would also locate any further westward occurances of pegmatite. The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.
References:	Great Basin GEM Joint Venture, 1983, Lake Mead G-E-M resources area (GRA no. NV-35) technical report (WSA's NV-050-0231, 050-0233, 050-0235, 050-0236, and 050-0238): U.S. Bureau of Land Management, contract YA-553-RFP2-1054, 33 p. Longwell, C. R., Pampeyan, E. H., Bowyer, Ben, and Roberts, R. J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines Bulletin 62, 218 p.

EXPLANATION

Mineral resources of the Garret Buttes Wilderness Study Area.

Name: Goshute Canyon
Area number: NV-040-015
Size (acres): 35,594 of which 22,225 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Poole and others, 1988).

Identified mineral resources (known): No mineral resources have been identified.

Mineral resource potential (undiscovered): The study area has moderate mineral resource potential for gold, silver, antimony, copper, lead, zinc, and tungsten in and near jasperoid replacement bodies. The rest of the study area has low mineral resource potential for the same metals. The study area has low energy resource potential for coal, oil and gas, uranium, and geothermal energy.

Mining activity: July 1989 BLM records show 165 mining claims in and immediately adjacent to the WSA. Most of the claims are in the southern part of the area, however there are a few in the extreme northern part. FMC currently holds a number of claims in this area and Amselco Exploration held claims in the area as recently as 1986. The rest of the claim activity involves small mining and exploration operators.

Geology: The central Cherry Creek Range is underlain by a west-dipping section of carbonate rocks and lesser amounts of shale and quartzite of Cambrian through Pennsylvanian age (see geologic time chart in Appendix). Notable geologic structures in the area include: (1) a thurst-fault system in the southwestern part of the area along which the Mississippian Chainman Shale overlies older Mississippian Joana Limestone or Devonian Guilmette Limestone; (2) a northwest-trending oblique-slip fault system that crosses the range along the southern margin of the agea; (3) a series of arcuate faults in the eastern part of the area that moved large blocks of Paleozoic rocks downward toward Steptoe Valley; and (4) a major normal fault system along the east side of the range.

Recommendations: Moderate interest in this area indicates there may be further mineral discoveries. As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 13,369 acres that constitute the balance.

References:

Great Basin GEM Joint Venture, 1983, Goshute Canyon G-E-M Resources Area (GRA NO. NV-03) Technical Report (WSA NV 040-015): prepared for U.S. Bureau of Land Management, 33 p.

Johnson F.L., 1986, Mineral Resources of the Goshute Canyon Study Area, Elko and White Pine Counties, Nevada: U.S. Bureau of Mines Open File Report MLA 77-86, 36 p.

Poole, F. G., Elrick, M., Tucker, R. E., Harris, R. N., Oliver, H. W., and Johnson F.L., 1988, Mineral Resources of the Goshute Canyon Wilderness Study Area , Elko and White Pine Counties, Nevada: U.S. Geological Survey Bulletin 1725-E, 13 p.

Smith R.M., 1976, Geology and Mineral Resources of White Pine County, Nevada: Nevada Bureau of Mines and Geology Bulletin 85, part II, p. 36-105.

EXPLANATION

Mineral resources of the Goshute Canyon Wilderness Study Area.

Name: Goshute Peak
Area number: NV-010-033
Size (acres): 69,770 of which 61,004 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Ketner and others, 1987).

Identified mineral resources (known): Carlin-type disseminated gold occurence on the western side of the WSA, about 2-4 mi southwest of Goshute Peak. High-calcium limestone is found throughout much of the WSA.

Mineral resource potential (undiscovered): Part of the Goshute Peak Wilderness Study Area has low resource potential for gold. There is high resource potential for high-purity limestone. The area has low resource potential for oil and gas.

Mining activity: Battle Mountain Exploration Co. drilled the disseminated gold occurrence during the summers of 1985-1986. Numerous unpatented mining claims are on file with the BLM.

Geology: Rock formations of the Goshute Peak Wilderness Study Area are mainly limestone and dolomite ranging in age from Cambrian to Permian (245 to 540 million years old). Less extensive areas are underlain by younger igneous rocks and unconsolodated alluvium. Principal structures include low angle planar faults that locally cut out portions of the stratigraphic column, listric, or curved, faults that merge from high angles to low angle, and near-vertical planar faults.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 8,766 acres that constitute the balance.

References:

Brown, S.D., 1985, Mineral resources of part of the Bluebell (NV-010-027) and Goshute Peak (NV-010-033) Wilderness Study Areas, Elko County, Nevada: U.S. Bureau of Mines Open-File Report MLA 66-85, 22 p.

Day, W.C., Elrick, Maya, Ketner, K.B., and Vaag, M.K., 1987, Geologic map of the Bluebell and Goshute Peak Wilderness Study Areas, Elko County, Nevada: U.S. Geological Survey Miscellaneous Field Studies Map MF-1932.

Granger, A.E., Bell, M.M., Simmons, G.C., Lee, Florence, 1957, Geology and mineral resources of Elko County, Nevada: Nevada Bureau of Mines Bulletin 54, 190 p.

Hill, J.M., 1916, Notes on some mining districts in eastern Nevada: U.S. Geological Survey Bulletin 648, p. 97-98.

Ketner, K.B., Day, W.C., Elrick, M., Vaag, M.K., Gerlitz, C.N., Barton, H.N., Saltus, R.S., and Brown, S.D., 1987, Mineral resources of the Bluebell and Goshute Peak Wilderness Study Areas, Elko County, Nevada: U.S. Geological Survey Bulletin 1725-C, 18 p.

EXPLANATION

Mineral resources of the Goshute Peak Wilderness Study Area.

Name: Grapevine Mountains (Bonnie Clair Flat)
Area number: NV-060-355
Size (acres): 66,800

Status of mineral surveys: This area was not studied by the U.S. Geological Survey or the U.S. Bureau of Mines.

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): The Grapevine Mountains Wilderness Study Area has moderate potential for undiscovered deposits of gold in placers.

Mining activity: There are no known active mines within the WSA. According to the Nevada Mining Association (1988) a plan of operation for a placer mine in the WSA was filed with the BLM. July 1989 BLM records show three active and 167 inactive mining claim locations within or adjacent to the WSA. A large claim block is situated near the NE corner.

Geology: The Grapevine Mountains are underlain by Paleozoic sedimentary rocks consisting of the Cambrian and Ordovician Nopah Formation and Pogonip Group as well as a Mississippian sequence of shaley rocks. The older rocks rest on the Mississippian rocks in thrust contact, the thrust is perhaps part of the Last Chance thrust. Tertiary rocks consist of the Timber Mountain Tuff as well as dacite intrusions.

Recommendations: The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

Great Basin GEM Joint Venture, 1983, Grapevine Canyon G-E-M Resources Area (GRA No. NV.-21) Technical Report (WSAs NV-050-0354 and 050-0355): Prepared for the U.S. Bureau of Land Management, contract YA-553-RFP2-1054, 33 p.

Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: unpublished report.

EXPLANATION

Mineral resources of the Grapevine Mountains Wilderness Study Area.

Name:	High Rock Canyon
Area number:	CA-020-913B
Size (acres):	33,300 of which 11,980 were studied at the request of the U.S. Bureau of Land Management.
Status of mineral surveys:	Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Turrin and others, 1988).
Identified mineral resources (known):	No mineral resources are identified in the wilderness study area.
Mineral resource potential (undiscovered):	Studies show that parts of the study area have a high potential for zeolite mineral resources in altered tuffaceous sediments, a moderate resource potential for gold, silver, and mercury in epithermal-type precious-metal deposits, and a low potential for uranium, lithium, geothermal energy, oil, and gas resources.
Mining activity:	The wilderness study area is not in a mining district. Six placer claims were located in 1911. There are no current mining claims in the wilderness study area according to October, 1988, U.S. Bureau of Land Management records. Major mining companies have explored for disseminated gold-silver-mercury deposits near the wilderness study area.
Geology:	The area is underlain by a sequence of Tertiary rhyolitic to dacitic ash-flow tuffs and flows. Two major sets of faults that trend northwest and northeast are present within the study area.
Recommendations:	As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 21,320 acres that constitute the balance. Massive opal and opalized breccia is present in the area, the same rock types that have been explored for gold-mercury deposits nearby. It is recommended that a detailed evaluation of these opalized areas be conducted.

References:

Ach, J.A., Plouff, Donald, and Turner R.L., Schmauch, S.W., 1987, Mineral resources of the East Fork High Rock Canyon wilderness study area, Washoe and Humboldt Counties, Nevada: U.S. Geological Survey Bulletin 1707-B, 14 p.

Bonham, H.F., 1969, Geology and mineral deposits of Washoe and Storey Counties, Nevada: Nevada Bureau of Mines Bulletin 70, 140 p.

Connors, R.A., Robinson, M.L., Bukofski, J.F., Meyer, W.T., and Howarth, R.J., 1982, Geochemical and geostatistical evaluation, wilderness study areas, Winnemucca district, northwest Nevada: prepared for BLM under contract YA-553-CT1-1096 by Barringer Resources, Inc., Golden, CO, 72 p. and appendices.

Geodata International, Inc., 1979, Aerial radiometric and magnetic survey-Vya national topographic map-Nevada: U.S. Department of Energy Open-File Report GJBX-136(79), vol. 1, 51 p., and appendices; vol. 2, 72 p.

Neumann, T.R., and Close T.J., 1985, Mineral resources of the High Rock Lake Wilderness Study Area, Humboldt County, Nevada: U.S. Bureau of Mines Open-File Report MLA 38-85, 14 p.

Schmauch, S.W., 1986, Mineral resources of the East Fork High Rock Canyon study area, Humboldt and Washoe Counties, Nevada: U.S. Bureau of Mines Open-File Report MLA 60-86, 9 p.

Scott, D.F., 1987, Mineral resources of the High Rock Canyon study area, Washoe County, Nevada: U.S. Bureau of Mines Open-File Report MLA 14-87, 18 p.

Stewart, J.H., and Carlson, J.E., compilers, 1978, Geologic map of Nevada: U.S. Geological Survey in cooperation with the Nevada Bureau of Mines and Geology, scale 1:500,000.

Turrin, B.D., Bergquist, J.R., Turner, R.L., Plouff, Donald, and Scott, D.F., 1988, Mineral resources of the High Rock Canyon Wilderness Study Area, Washoe County, Nevada: U.S. Geological Survey Bulletin 1707-D, 14 p.

Mineral resources of the High Rock Canyon Wilderness Study Area.

Name: High Rock Lake
Area number: NV-020-007
Size (acres): 61,902 of which 14,000 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Noble and others. 1987).

Identified mineral resources (known): Soldier Meadow Known Geothermal Resource Area occurs along the north boundary of the study area.

Mineral resource potential (undiscovered): A low potential exists throughout the study area for undiscovered volcanic-hosted resources of mercury, uranium, and disseminated gold. The northern part of the study area has low potential for undiscovered geothermal energy resources.

Mining activity: The Donnelly mining district, about ten miles south of the study area, has reported production of $100,000 in gold and silver. Little activity has been reported from this district in recent years. A zeolite, clinoptilolite, occurs at Donnelly Creek, about eight miles south of the study area.

Several claims, staked for uranium southwest of the study area, disclosed no resources when examined by U.S. Bureau of Mines personnel.

Scattered gold and silver anomalies occur about 15 miles south of the study area in the vicinity of the Hog Ranch gold mine; amount of prospecting here has not been determined.

Two miles south of the study area, precious and common opal are mined sporadically in Willow Canyon.

July 1989 BLM records show no claims active in the WSA.

Geology: The study area is underlain by slightly tilted Miocene rhyolitic volcanic rocks. Rocks in the northwestern part of the study area locally exhibit weak hydrothermal alteration. A major active normal fault system bounds the west margin of the range.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 47,902 acres that constitute the balance.

References:

Bonham, H.F., 1969, Geology and mineral deposits of Washoe and Storey Counties, Nevada, with a section on industrial rock and mineral deposits by Keith G. Papke: Nevada Bureau of Mines and Geology Bulletin 70, 140 p.

Conners, R.A., Robinson, M.L., Bukofski, J.F., Meyer, W.T., and Howarth, R.J., 1982, Geochemical and geostatistical evaluation of wilderness study areas, Winnemucca District, northwestern Nevada: Golden, Colorado, Barringer Resources, Incorporated for U.S. Bureau of Land Management contract Open-File Report, v. 1-5, 2 plates.

Greene, R.C., and Plouff, Donald, 1981, Location of a caldera source for the Soldier Meadow Tuff, northwestern Nevada, indicated by gravity and aeromagnetic data: Geological Society of America Bulletin, Part I, v. 92, p. 4-6 and Part II, v. 92, p. 39-56.

Muffler, L.J.P., ed., 1979, Assessment of geothermal resources of the United States--1978: U.S. Geological Survey Circular 790, 163 p., map 1 scale 1:250,000.

Neumann, T.R., and Close, T.J., 1985, Mineral resources of the High Rock Lake Wilderness Study Area (BLM No. NV-020-007), Humboldt County, Nevada: U.S. Bureau of Mines Open-File Report MLA 38-85, 14 p.

Noble, D.C., McKee, E.H., Smith, J.G., and Korringa, M.K., 1970, Stratigraphy and geochronology of Miocene volcanic rocks in northwestern Nevada: U.S. Geological Survey Professional Paper 700-D, p. D23-D32.

Noble, D.C., Plouff, Donald, Bergquist, J.R., Neumann, T.R., and Close, T.J, 1987, Mineral resources of the High Rock Lake Wilderness Study Area, Humboldt County, Nevada: U.S. Geological Survey Bulletin 1707-A, 9 p.

Stewart, J.H., and Carlson, J.E., compilers, 1978, Geologic map of Nevada: U.S. Geological Survey in cooperation with the Nevada Bureau of Mines and Geology, scale 1:500,000.

Stuart, E.J., Bornhorst, T.J., Rose, W.I., Jr., and Noble, D.C., 1983, Distribution and mobility of uranium and thorium in the peralkaline Soldier Meadow Tuff, northwestern Nevada: Economic Geology, v. 78, p. 353-358.

Vanderburg, W.O., 1938, Reconnaissance of mining districts in Humboldt County, Nevada: U.S. Bureau of Mines Information Circular 6995, 54 p.

Wilden, Ronald, 1964, Geology and mineral deposits of Humboldt County, Nevada: Nevada Bureau of Mines Bulletin 59, 154 p.

Mineral resources of the High Rock Lake Wilderness Study Area.

Explanation, mineral resources of the High Rock Lake Wilderness Study Area.

Name: Ireteba Peaks

Area number: NV-050-438

Size (acres): 14,994 of which 13,374 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Conrad and others, 1990).

Identified mineral resources (known): There are identified subeconomic resources totalling 240,000 tons of 0.037 oz/t gold, 0.12 oz/t silver, and minor copper on the Cobalt claims (Causey, 1988).

Mineral resource potential (undiscovered): There is low to moderate potential for gold, silver, copper, lead, and zinc in the southeast part of the study area. Low potential for these commodities exists throughout the rest of the study area. A uranium occurrence has been noted in Precambrian rocks on the west edge of the study area (Garside, 1973), suggesting low potential for uranium in these rocks. However, later studies have been unable to confirm this occurrence. There is abundant sand and gravel on the east and west sides of the study area, but similar deposits are widely available outside the study area and closer to major markets; there is low potential for significant resources of these commodities in the study area. There is no potential for oil and gas resources.

Mining activity: The WSA is on the southern edge of the Eldorado mining district, the northeastern edge of the Searchlight mining district, and the northwestern edge of the Newberry mining district. At least $6 million in gold, silver, copper, lead, and zinc along with minor mercury were recovered from the Eldorado district; $7 million, mostly gold from the Searchlight district; and less than $200,000 in gold and silver, from the Newberry district.

Recent mining activity has been done by small operators on the northwestern and southeastern edges of the WSA. Just west of the WSA there was extensive claim staking on pediment surfaces. Activity in 1988 consisted of mining the pediment gravel and processing in separation mills located on the claims. There is one patented claim in the WSA (Crystal Lode) and several on the southeastern (Sazarac group) and southwestern borders (St Louis group).

July 1989 BLM records show 18 lode and 6 placer mining claims in the WSA.

Geology: The Ireteba Peaks study area is underlain primarily by numerous dikes and small granitic stocks of Miocene age that intrude the Precambrian schist, gneiss, and granite that underlie small parts of the study area.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 1,620 acres that constitute the balance.

References:

Causey, J. D., 1988, Mineral resources of the Ireteba Peaks study area, Clark County, Nevada: U.S. Bureau of Mines Open File Report MLA 46-88, 46 p.

Conrad, J.E., Nowlan, G.A., and Causey, J.D., 1990, Mineral resources of the El Dorado and Ireteba Peaks Wilderness Study Areas, Clark County, Nevada: U.S. Geological Survey Open-File Report

Garside, L.J., 1973, Radioactive mineral occurrences in Nevada: Nevada Bureau of Mines and Geology Bulletin 81, 121 p.

Great Basin GEM Joint Venture, 1983, Eldorado Mountains G-E-M resources area (GRA no. NV-37) technical report (WSA's NV-050-0423 and 050-0438): Prepared for the U.S. Bureau of Land Management, contract YA-554-RFP2-1054, 33 p.

Hewett, D. F., Callaghan, Eugene, Moore, B. N., Nolan, T. B., Rubey, W. W., and Schaller, W. T., 1936, Mineral resources of the region around Boulder Dam: U.S. Geological Survey Bulletin 871, 197 p.

Longwell, C.R., Pampeyan, E.H., Bowyer, Ben, and Roberts, R.J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines and Geology Bulletin 62, 218 p.

Olson, J. C., and Hinrichs, E. N., 1960, Beryl-bearing pegmatites in the Ruby Mountains and other areas in Nevada and northwestern Arizona: U.S. Geological Survey Bulletin 1082-D, p. 135-200.

Smith, P. L., and Tingley, J. V., 1983, A mineral inventory of the Esmeralda-Stateline Resource Area, Las Vegas District, Nevada: Nevada Bureau of Mines and Geology Open-file Report 83-11, 173 p.

Vanderburg, W. O., 1937, Reconnaissance of mining districts in Clark County, Nevada: U.S. Bureau of Mines Information Circular 6964, 81 p.

EXPLANATION

Mineral resources of the Ireteba Peaks Wilderness Study Area.

Name:	Job Peak
Area number:	NV-030-127
Size (acres):	90,209
Status of mineral surveys:	This area was not studied by the U.S. Bureau of Mines or the U.S. Geological Survey.
Identified mineral resources (known):	No mineral resources have been identified in the Wilderness Study Area.
Mineral resource potential (undiscovered):	This area has moderate potential for epithermal gold-silver mineralization of Comstock-type (quartz-adularia veins) in altered Tertiary volcanic rocks in West Job Canyon near the northern end of the area and in Elevenmile and East Lee Canyons in the southeastern part of the area, where altered rocks locally contain areas of quartz veins; low potential for geothermal energy along the east side of the area in Dixie Valley; low or no potential for oil and gas resources; and low potential for industrial materials.
Mining activity:	In the 1860s, the La Plata mining district, just south of the Job Peak WSA, experienced a minor rush of activity associated with silver exploration, but very little silver was actually produced. Two mills were built, one in Elevenmile Canyon, on the southern border of the study area, and one in La Plata Canyon, south of the WSA. The Dixie mine, in La Plata Canyon, 1 to 2 miles outside of the southeastern portion of the Stillwater Range, shipped 666 tons of 65 percent CaF2 (fluorite) to Fallon, Nevada. The Black Hills prospect, another fluorspar property, is also located in La Plata Canyon. According to U.S. Bureau of Mines Mineral Production Records, the Creeore mine, about two miles north of the WSA, in the IXL mining district, produced a total of 12 tons of ore in 1953 and 1955. From this ore, 81 oz of silver, 560 lb of copper, 2,172 lb of lead, and 134 lb of zinc were recovered. There are about 225 mining claims in the area (BLM records, July 1989). Portions of the area have also been leased for oil and gas (13,203 acres) or geothermal exploration (15,800 acres). Three wells have been drilled for geothermal energy exploration by Hunt Energy Corporation. Exploration is being conducted by a number of companies.

Geology: Most of the area is underlain by Oligocene and Miocene volcanic, plutonic, and sedimentary rocks. These rocks include thick sequences of ash-flow tuff that form three small calderas, cogenetic granitic plutons that represent of the roots of the calderas, older andesite flows, rhyolite domes and dikes, lacustrine and fluvial sedimentary rocks, and younger andesite and basalt flows. The ash-flow tuffs, granites, and older andesites were faulted and steeply tilted about 23 Ma and are overlain by flat-lying, unaltered, younger andesites and basalts and intruded by the rhyolite domes. These younger volcanic rocks primarily occur in the western half of the area. Sedimentray rocks locally underlie the younger andesite and basalts. Several areas of hydrothermal alteration that locally contain quartz veins and gold and silver are present in the older volcanic rocks including in West Job Canyon near the northern edge of the area and in the upper parts of Elevenmile and East Lee Canyons near the southeastern end of the area. The eastern and western edges of the area are covered by Quaternary alluvial deposits including basin fill on the east side and lake terraces on the west side. The active (1954) Dixie Valley fault occurs near the eastern edge of the area.

Recommendations: Detailed mapping and geochemical sampling of altered areas are needed to determine the extent of mineralization. The wilderness study area should be studied as part of a comprehensive mineral survey by the Bureau of Mines and Geological Survey.

References:

Great Basin GEM Joint Venture, 1983, Stillwater Range G-E-M Resources Area (GRA No. NV-04) Technical Report (WSAs NV 030-104 and 030-127): under contract YA-554-RFP2-1054 for the BLM, Reno, Nevada, 44 p.

Higgins, L. R., Earnest, D. F., and Cox, A. D., 1988, Nevada BLM Wilderness Study Areas mineral potential handbook: Nevada Mining Association, Reno, Nevada, 257 p.

Horton, R. C., 1961, An inventory of Fluorspar occurrences in Nevada:Nevada Bureau of Mines Report 1, 31 p.

John, D. A., unpublished geologic maps of the Table Mountain and La Plata Canyon 7-1/2 minute quadrangles

Page, B. M., 1965, Preliminary geologic map of a part of the Stillwater Range, Churchill County, Nevada: Nevada Bureau of Mines and Geology, Map 28, scale 1:125,000.

Quade, J., and Tingley, J. V., 1987, Mineral resource inventory--U.S. Navy master land withdrawl area, Churchill County, Nevada: Nevada Bureau of Mines and Geology Open File Report 87-2, 99 p.

Willden, Ronald, and Speed, R. C., 1974, Geology and mineral deposits of Churchill County, Nevada: Nevada Bureau of Mines and Geology Bulletin 83, 95 p.

EXPLANATION

Mineral resources of the Job Peak Wilderness Study Area.

Name: Jumbo Springs
Area number: NV-050-236
Size (acres): 3,466

Status of mineral surveys: This area was not studied by the U.S. Bureau of Mines or the U.S. Geological Survey.

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): Beryllium deposits occur in pegmatite, lead and zinc has been produced in this area, and there has been gold production of less than 10,000 onces. Given the abunance of granite and extensiveness of the veining systems the resource potential for these elements is low to moderate.

Mining activity: July 1989 BLM records show one active mining claim in the WSA. There are three nearby mines and prospects south and west of the WSA (Lakeshore, Windmill, and Winona). Only the Lakeshore has reported production ($100,000 in gold).

Geology: This entire study area is composed of metamorphic and granitic rocks. Highly folded lenses of granite and pegmatite are intercalated with porphyritic rapakivi granite.

Recommendations: Detailed geologic mapping, geochemical sampling, and geophysical studies would add greatly to the understanding of the resource potential of this area. The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

Great Basin GEM Joint Venture, 1983, Lake Mead G-E-M resources area (GRA no. NV-35) technical report (WSA's NV-050-0231, 050-0233, 050-0235, 050-0236, and 050-0238): Prepared for the U.S. Bureau of Land Management, contract YA-553-RFP2-1054, 33 p.

Longwell, C. R., Pampeyan, E. H., Bowyer, Ben, and Roberts, R. J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines Bulletin 62, 218 p.

EXPLANATION

Mineral resources of the Jumbo Springs Wilderness Study Area.

Name: Kawich
Area number: NV-060-019
Size (acres): 54,320

Status of mineral surveys: This area was not studied by the U.S. Bureau of Mines or the U.S. Geological Survey.

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area; however, mineral resource data are not sufficient to evaluate possible ore body extensions into the area from nearby mines and to determine the possible presence of mineral resources at numerous mines and prospects in the Kawich area.

Mineral resource potential (undiscovered): There is moderate potential for epithermal gold-silver veins of the Comstock-type (quartz-adularia) in silicic dikes and domes along the margins of the Kawich caldera and in fault zones along the southwestern, northeastern, and eastern sides of the area. There is low potential for oil and gas. There is low potential for geothermal energy. There is low potential for industrial materials.

Mining activity: The Kawich Wilderness Study Area is included in four mining districts: Bellehelen on the north, Eden on the east, Silverbow on the south, and Golden Arrow on the west. Metal production from these districts was primarily silver and gold. The South Star mine, in the WSA, has recorded production of 531 oz of silver. U.S. Bureau of Mines MILS records show 11 precious metal producing mines on or near the area boundary.

July 1989 BLM mining claim records show 255 lode claims located in the Kawich Wilderness Study Area. Oil and gas leases cover a portion of the east, west, and north parts of the area (U.S. Bureau of Land Management, 1987).

Geology: The entire area is underlain by Tertiary volcanic rocks that are locally covered by Quaternary alluvium. Most of the area is covered by late Oligocene intracaldera ash-flow tuffs from the Kawich caldera. These tuffs are intruded by silicic domes and dikes and locally overlain by andesite lavas. The eastern part of the area is covered by alluvium.

Recommendations: Geologic mapping and geochemical sampling of mineralized structures along the edges of the area need to be undertaken to determine if mineralization extends into the area. The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey. A mineral survey is particularly important due to the persistent mineral exploration interest in this area and the lack of specific information about known prospects and mineralized structures in the area.

References:

Cornwall, H.R., 1972, Geology and mineral deposits of southern Nye County, Nevada: Nevada Bureau of Mines and Geology Bulletin 77, 49 p.

Couch, B.F., and Carpenter, J.A., 1943, Nevada's metal and mineral production (1859-1940): University of Nevada Bulletin, v. 37, no. 4, 159 p.

Gardner, J. N., Eddy, A. C., Goff, F. E., and Grafft, K. S., 1980, Reconnaissance geologic map of the northern Kawich & southern Reveille Ranges, Nye County, Nevada:University of California, Los Alamos Scientific Laboratory, Map LA-8390-Map, scale 1:62,500.

Kleinhampl, F.J., and Ziony, J.I., 1984, Mineral resources of Northern Nye County, Nevada: Nevada Bureau of Mines and Geology Bulletin 99B, 243 p.

Kral, V.E., 1951, Mineral resources of Nye County, Nevada: University of Nevada Bulletin, v. 45, no. 3, 223 p.

U.S. Bureau of Land Management, 1987, Final Environmental Impact Statement, wilderness recommendations for the Tonopah Resource Area, Nevada, 333 p.

EXPLANATION

Mineral resources of the Kawich Wilderness Study Area.

Name: La Madre Mountains

Area number: NV-050-412

Size (acres): 56,243 of which 34,010 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Conrad and others, 1986).

Identified mineral resources (known): There are no identified resources within the area studied. The White Beauty mine at the northern boundary of the WSA contains (from owner estimation) gypsum reserves totalling 14 million tons and inferred resources of 22 million tons.

Mineral resource potential (undiscovered): Two prospects were located and examined within the study area; these have traces of copper, and sporadic high grade blebs containing silver, lead, and zinc. These prospects and the surrounding area have low mineral resource potential for silver, lead, and zinc.

Mining activity: There are no active mines within the WSA. July 1989 BLM mining records show 26 active and 89 inactive claims within or adjacent to the WSA.

Geology: The area is underlain by a sequence of marine limestones and dolomites of Cambrian to Permian age (570-240 million years before present), and mostly subearial sandstone and siltstone deposits of Triassic and Jurassic age (240-38 million years before present). Northwest-trending high-angle faults, large scale thrust faults, and associated folds have greatly disrupted these strata, placing Cambrian dolomite on top of Jurassic sandstone in some places.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 22,233 acres that constitute the balance.

References:

Conrad, J.E., Barton, H.N., and Lipton, D.A., 1986, Mineral resources of the La Madre Mountains Wilderness Study Area, Clark County, Nevada: U.S. Geological Survey Bulletin 1730-A, 9 p.

Great Basin GEM Joint Venture, 1983, La Madre Mountains/Pine Creek G-E-M Resources Area (GRA No. NV.-32) Technical Report (WSAs NV-050-0412 and 050-0414): Prepared for the U.S Bureau of Land Management (contract YA-554-RFP2-1054): 34 p.

Lipton, D. A., 1985, Mineral Resources of the La Madre Mountains Study Area, Clark County, Nevada: U.S. Bureau of Mines Open File Report MLA 41-85, 14 p.

Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: unpublished report.

Mineral resources of the La Madre Mountains Wilderness Study Area.

Explanation, mineral resources of the La Madre Mountains Wilderness Study Area.

Name:	Lime Canyon
Area number:	NV-050-231
Size (acres):	34,680
Status of mineral surveys:	The Wilderness Study Area has been studied as part of mineral surveys by the U.S. Bureau of Mines and the U.S. Geological Survey (Evans and others, 1990).
Identified mineral resources (known):	There are an estimated 44 million tons indicated subeconomic gypsum resources. About 16 square miles of the WSA are underlain by an inferred subeconomic sand and gravel resource. Limestone and dolostone occur over 20 square miles and are classified as an inferred subeconomic resource.
Mineral resource potential (undiscovered):	The Lime Canyon study area has low resource potential for barium in bedded barite deposits in two large areas and two small areas underlain by Paleozoic, Mesozoic, and Miocene sedimentary rocks. Three small areas in the east, north, and west parts of the study area have low potential for both gold and barium. There is a low resource potential for silver in the south-central part of the wilderness in two areas underlain by altered Proterozoic and younger carbonate rocks. There is also a low potential for both gold and silver in the south-central part of the study area in an area underlain by Proterozoic rocks. Based on exploratory drilling and nearby oil and gas shows, the area is judged to have low resource potential for oil and gas in areas underlain by Paleozoic, Mesozoic, and Miocene sedimentary rocks (Sandberg, 1983). No potential was identified for geothermal resources (Evans and others, 1990).
Mining activity:	The Wilderness Study Area is in the Gold Butte mining district. Mining of mica began in 1873 outside the study area. At least 6.25 tons of sheet mica were shipped. Later, ultramafic rocks in the vicinity were mined for vermiculite. Metal mining began about 1905 with discovery of gold in veins in the metamorphic and granitic rocks south of Gold Butte, outside the study area. In 1907, replacement deposits of silver-bearing copper and zinc ore were found in Paleozoic limestone north of Gold Butte and east of the study area. Small shipments of copper and zinc ore were reported (Longwell, and others, 1965, p. 126). Since 1918 gold-bearing quartz veins in granitic rocks have produced less than 2,857 troy ounces of gold (Longwell, 1965, p. 128 and Couch and Carpenter, 1943). One of these gold properties, outside the study area, was in small-scale operation in 1987. In the WSA, 1987 examinations revealed: a) Three shafts, one adit and other minor workings in carbonates and redbeds.

b) Seven patented gypsum claims and two unpatented mineral surveys.

c) Numerous uranium exploration trenches in Tertiary sediments.

d) Current gold claims with minor workings in alluvium adjacent to the site of the mining camp of Gold Butte.

July 1989 BLM records show approximately ten lode and nine placer mining claim locations active in or adjacent to the WSA, all near the site of the mining camp of Gold Butte. In March 1987, 37 percent of the study area was covered by oil and gas leases.

Geology: The Lime Canyon study area is underlain by Proterozoic gneiss and granitic rocks. These are overlain by a thick section of Paleozoic and Mesozoic sedimentary rocks that include limestone, dolomite, sandstone, and gypsum. These are in turn overlain by Tertiary sediments that include fanglomerate and gypsiferous sandstone and siltstone. Younger alluvium is found in drainages and over the lower slopes of the area (Evans and others, 1990).

Recommendations: Drilling is required to evaluate gypsum resources. Additional surface sampling, mapping, and drilling are necessary to evaluate the limestone and dolostone. Broad magnetic anomalies over the study area (Aero Service Division, 1979) may indicate underlying igneous and sedimentary rocks at shallow depths and should be considered during an evaluation of the area as these igneous and metamorphic rocks are mineralized in the vicinity; replacement deposits in carbonates near igneous rocks may occur.

References:

Aero Service Division, 1979, Airborne Gamma-Ray Spectrometer and magnetometer survey, Las Vegas Quadrangle (Arizona, California, Nevada), Williams Quadrangle (Arizona), Prescott Quadrangle (Arizona), and Kingman Quadrangle (Arizona, California, Nevada), Final Report, volumes I and II: Houston, Tx, Western Geophysical Company of America, for U.S. Department of Energy, Open-File report GJBX 59(79).

Bowyer, Ben, Pampeyan, E. H., and Longwell, C. R., 1958, Geologic map of Clark County, Nevada: U.S. Geological Survey Miscellaneous Field Investigations Map MF-138, scale 1:200,000.

Bureau of Land Management, 1988, Draft environmental impact statement, Preliminary wilderness recommendations for Nevada contiguous lands: Department of Interior, Bureau of Land Management, Ely, Las Vegas, and Winnemucca Districts, 291 p, unpaginated section of maps.

Cook, J.R., and Fay, W.M., 1982, Data report: western United States, National Uranium Resource Evaluation Program, hydrogeochemical and stream sediment reconnaissance: Aiken, SC, E.I. du Pont de Nemours and Company, Savannah River Laboratory, for U.S. Department of Energy, Open-File report GJBX 132(82), 33 p.

Couch, B.F., and Carpenter, J.A., 1943, Nevada's metal and mineral production (1859-1940, inclusive): Nevada Bureau of Mines and Geology Bulletin 38, No. 4, 159 p.

Evans, J.G, Nowlan, G.A., and Winters, R.A., 1990, Mineral resources of the Lime Canyon Wilderness Study Area, Clark County, Nevada: U.S. Geological Survey Bulletin.

Great Basin GEM Joint Venture, 1983, Lake Mead G-E-M Resources Area (GRA NO. NV-35) Technical Report (WSA's NV 050-0231, 050-0233, 050-0235, 050-0236, and 050-0238): Prepared for the U.S. Bureau of Land Management, 39 p.

Longwell, C.R., Pampeyan, E.H., Bowyer, Ben, and Roberts, R.J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines Bulletin 62, 218 p.

Morgan, J.R., 1968, Structure and stratigraphy of the northern part of the South Virgin Mountains, Clark County, Nevada: Albuquerque, University of New Mexico, Masters thesis, 103 p.

Murphy, T.D., 1954, Silica resources of Clark County, Nevada: Nevada Bureau of Mines Bulletin 55, 33 p.

Nevada Mining Association, 1988, Nevada BLM wilderness study areas mineral potential handbook: Nevada Mining Association, One East First Street, Reno, NV.

Qualheim, B.J., 1978, Hydrogeochemical and stream sediment reconnaissance basic data report for Las Vegas NTMS Quadrangle, Arizona, California, and Nevada: Livermore, CA, Lawrence Livermore Laboratory, for U.S. Department of Energy, Open-File report GJBX-123(78), 42 p. plus two appendixes.

Sandberg, C. A., 1983, Petroleum potential of wilderness lands in Nevada: U.S. Geological Survey Circular 902-H, 11 p.

Vanderburg, W.O., 1936, Placer Mining in Nevada: Nevada Bureau of Mines and Geology Bulletin 27, 180 p.

Vanderburg, W.O., 1937, Reconnaissance of mining districts in Clark County, Nevada: U.S. Bureau of Mines Information Circular 6964, 81 p.

Winters, R.A., 1988, Mineral resources of the Lime Canyon Wilderness Study Area, Clark County, Nevada: U.S. Bureau of Mines Open-File Report MLA 40-88, 42 p.

EXPLANATION

Mineral resources of the Lime Canyon Wilderness Study Area.

Name:	Little High Rock Canyon (Yellow Rock Canyon)
Area number:	CA-020-913/NV-020-008
Size (acres):	52,143 of which 17,320 were studied at the request of the U.S. Bureau of Land Management.
Status of mineral surveys:	Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Keith and others, 1987).
Identified mineral resources (known):	No mineral resources have been identified in the Wilderness Study Area (WSA), but 2 million tons of subeconomic perlite, and over 28 million tons of subeconomic pozzolanic sediments occur within and adjacent to the WSA.
Mineral resource potential (undiscovered):	The results of studies suggest three areas with moderate resource potential for gold and silver in epithermal deposits in the northwestern, central, and southern parts of the area. Elsewhere within the study area, the potential for these resources is low. Two small areas in the southeastern part of the study area have low potential for uranium resources; one small area has low potential for pozzolan resources, and one area has low potential for perlite resources. Potential for geothermal resources is low in the entire study ares.
Mining activity:	The Hog Ranch gold mine lies southwest of the WSA and the Jabo epithermal gold prospect is within WSA. There are between 500 and 750 active claims in or near the WSA. The claims extend from the Hog Ranch mine, southwest of the WSA, or are part of the Jabo prospect in the south central part of the WSA.
Geology:	The study area is underlain by a sequence of lava flows and pyroclastic deposits that overlie and interfinger with lake and stream sediments; all are of Miocene age. These volcanic and sedimentary rocks are faulted and locally altered.
Recommendations:	As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 34,823 acres that constitute the balance. The structural lineament hosting the gold extends into the wilderness study area. A comprehensive study of this structure is recommended.
References:	Bonham, J. F., 1969, Geology and mineral deposits of Washoe and Storey Counties, Nevada, with a section on industrial mineral deposits by K. G. Papke: Nevada Bureau of Mines and Geology Bulletin 70, 140 p.

Connors, R. A., Robinson, M. L., Bukofski, J. F., Meyer, W. T., and Howarth, R. J., 1982, Geochemical and geostatistical evaluation (of) wilderness study areas, Winnemucca district, northwest Nevada: prepared under contract YA-553-CT1-1096 for the U.S. Bureau of land Management by Barringer Resources, Inc., v. 1-5, 72 p.

Keith, W. J., Turner, R. L., Plouff, Donald, and Peters, T. J., 1987, Mineral resources of the Little High Rock Canyon Wilderness Study Area, Humboldt and Washoe Counties, Nevada: U.S. Geological Survey Bulletin 1707-C, 17 p.

Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: Reno, Nevada, unnumbered pages.

Peters, T. J., Munts, S. R., and Miller, M. S., 1987, Mineral resources of the Little High Rock Canyon study area, Humboldt and Washoe Counties, Nevada: U.S. Bureau of Mines Open-File Report MLA 16-87, 39 p.

U. S. Bureau of Land Management, 1984, Eagle Lake/Cedarville study areas Draft Environmental Impact Statement: U.S. Bureau of Land Management, Susanville (CA) District Office, 340 p.

Mineral resources of the Little High Rock Canyon Wilderness Study Area.

Explanation, mineral resources of the Little High Rock Canyon Wilderness Study Area.

Name: Little Humboldt River
Area number: NV-010-132
Size (acres): 42,213 of which 40,000 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Wallace and others, 1988).

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area. Within one-half mi north of the WSA a 20-ft-thick diatomaceous bed crops out containing 60-85 percent diatoms. This bed is estimated to contain 43,000 tons of diatomaceous material, but not of sufficient quality to compete with material presently marketed.

Mineral resource potential (undiscovered): Parts of the area have a high, medium, or low mineral resource potential for disseminated gold deposits and zeolites. Some areas have an unknown mineral resource potential for bedded barite and disseminated gold in rocks beneath the volcanic cover. The entire study area has a low resource potential for uranium and thorium, diatomite, tin, arsenic, antimony, silver, and mercury, oil and gas, geothermal energy, and sand and gravel.

Mining activity: There is no known mineral production within the WSA. The Gold Circle mining district encompassing the south end of the area produced about 127,000 oz gold and 1.6 million oz silver from 132,000 tons of ore from an area about 6 mi south of the WSA. The Paradise tungsten prospect lies 2 mi south of the study area. Numerous mining companies are conducting exploration on the south, east, and west sides of the WSA.

July 1989 BLM records show approximately 550 active mining claims in the WSA. The southern half of the WSA is covered by oil and gas leases.

Geology: The wilderness study area is underlain by a complex, interlayered sequence of volcanic rocks that were erupted between about 10 and 15 m.y. (million years) ago. The oldest rocks are rhyolitic flows and tuffs and lesser amounts of ash-rich sedimentary rocks and andesitic flows, dikes, and tuffs. These rocks were cut by steep faults that produced a large, north-trending basin. Ash-flow tuffs were erupted into this basin as it developed, forming the widespread tuff of the Little Humboldt River. Subsequently, widespread shallow lakes covered surrounding areas, and large volumes of crystal-rich rhyolitic flows were erupted just west of the wilderness study area. About 10 m.y. age, basalt flows were erupted near the northeastern edge of the study area. Active faulting during volcanic activity produced a complex relation between volcanic units and various fault systems.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 2,213 acres that constitute the balance.

References:

Gabby, P.N., 1986, Mineral resources of the Little Humboldt River study area, Elko County, Nevada: U.S. Bureau of Mines Open-File Report MLA 23-87, 27 p.

Granger, A.E., Bell, M.N., Simmons, G.C., and Lee, Florence, 1957, Geology and mineral resources of Elko County, Nevada: Nevada Bureau of Mines and Geology Bulletin 54, 190 p.

Smith, R.M., 1976, Mineral resources of Elko County, Nevada: U.S. Geological Survey Open-File Report 76-56, p. 73-74.

Wallace, A.R., Turner, R.L., Grauch, V.J.S., Plesha, J.L., Krohn, M.D., Duval, J.S., and Gabby, P.N., 1988, Mineral resources of the Little Humboldt River Wilderness Study Area, Elko County, Nevada: U.S. Geological Survey Bulletin 1732-B, 20 p.

Mineral resources of the Little Humboldt River Wilderness Study Area.

Explanation, mineral resources of the Little Humboldt River Wilderness Study Area.

Name: Marble Canyon (Granite Springs)
Area number: NV-040-086
Size (acres): 23,327 of which 8,300 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Diggles and others, 1990)

Identified mineral resources (known): Large inferred subeconomic limestone and marble resources inside the study area are without special or unique properties. The carbonate rocks are suitable for use in aggregate, but there are no nearby markets and similar quality resources are present elsewhere.

Mineral resource potential (undiscovered): The lower part of Bars Canyon has high mineral resource potential for limestone and marble. The rest of the wilderness study area has moderate mineral resource potential for marble. The parts of the Marble Canyon Wilderness Study Area underlain by the upper plate of the northern Snake Range décollement have low mineral resource potential for gold and silver associated with low-angle faults. The parts of the study area where the décollement is still present and extending east and south to the Mount Moriah Roadless Area have low potential for copper, lead, and zinc. Areas underlain by exposures of the décollement and upper-plate rocks have low mineral resource potential for tungsten and molybdenum. The geophysical study suggests that no plutons are buried beneath the study area, but anomalous concentrations of beryllium in geochemical samples collected from the study area could be explained by the presence of a buried pluton. Areas having exposures of the décollement and rocks overlying the fault have low mineral resource potential for beryllium and fluorite. The adits inside the southeastern boundary of the study area contain barite and anomalous concentrations of barium were measured in geochemical samples from upper-plate rocks. The zone around the adits has moderate mineral resource potential for barite; the surrounding area has low mineral resource potential for barite. On the basis of geochemical data, the zone around the adit and the surrounding area have low mineral resource potential for silver, copper, lead, zinc, and tungsten. The metamorphosed lower plate rocks, thin sequences of faulted upper plate rocks, and extrusive volcanic rocks exposed in the study area are not conducive to the formation and accumulation of hydrocarbons. The resource potential for oil and gas in the entire study area is low but this assessment may be too high due to the lack of likely source rocks. There are two thermal springs in Spring Valley to west of the study area and thermal springs just east of the study area. Range-front faults may provide a conduit for the circulation of thermal water and the system could extend into the study area. The entire Marble Canyon Wilderness Study Area has low potential for geothermal energy resources associated with low-temperature thermal springs.

Mining activity: The Marble Canyon mining district near the northern boundary encompasses the Marble Wash area. Prospecting and limestone quarrying have taken place in the study area. Marble claims were first located in 1891. Two short adits are located inside the southwestern boundary. Breccia zones, not traceable beyond the workings, contained some pathfinder elements typical of detachment fault-related deposits.

Geology: The area is underlain by shales and carbonate rocks of early Paleozoic age. The oldest rocks in the area are metamorphosed marble and phyllite of Early and Middle Cambrian age. Shale of Late Cambrian age has been faulted over the metamorphosed rocks. Dolomite, shale, and quartzite of Ordovician and Silurian age are also in fault contact with the Upper Cambrian rocks. The structural history of the study area includes the development of a detachment fault that juxtaposes metamorphosed Paleozoic rocks beneath, and in flat-fault contact with less-metamorphosed to nonmetamorphosed rocks. This detachment fault is called the northern Snake Range décollement.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 15,027 acres that constitute the balance.

References:

Darton, N.H., 1908, Marble of White Pine county, Nevada, near Gandy, Utah: U.S. Geological Survey Bulletin 340 G, p. 377-380.

Diggles, M.F., Nowlan, G.A., Blank, R.H., Jr., Marcus, S.M., and Kness, R.F., 1990, Mineral resources of the Marble Canyon Wilderness Study Area, White Pine County, Nevada, and Millard County, Utah: U.S. Geological Survey Bulletin

Hose, R.K., Blake, M.C., and Smith, R.M., 1976, Geology and mineral resources of White Pine County, Nevada: Nevada Bureau of Mines and Geology Bulletin 85, 105 p.

Kness, R.F., 1989, Mineral investigation of the Marble Canyon Wilderness Study Area (NV-040-086) White Pine County, Nevada, and Millard County, Utah: U.S. Bureau of Mines Open-File Report MLA 17-89, 22 p.

EXPLANATION

Mineral resources of the Marble Canyon (Granite Springs) Wilderness Study Area.

Name: Massacre Rim

Area number: CA-020-1013

Size (acres): 110,000 of which 23,260 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Bergquist and others, 1988).

Identified mineral resources (known): There are no identified mineral resources in the wilderness study area.

Mineral resource potential (undiscovered): There is moderate mineral resource potential for gold, silver, and mercury in hydrothermal deposits in the eastern part of the study area. There is moderate mineral resource potential for uranium throughout the study area. There is no potential for oil and gas in the study area. The potential for geothermal resources is unknown.

Mining activity: There has been no known prospecting activity or mineral production from the wilderness study area. The wilderness study area is not part of any organized mining district and there are no current mining claims according to October, 1988, U.S. Bureau of Land Management records.

Geology: The study area is underlain mostly by basalt flows of Miocene age. The basalt mostly covers older Tertiary rhyolite and tuffaceous alluvial and lake deposits of Tertiary to Holocene age. In many places in the region the basalt has been eroded, exposing the underlying older rocks and tuffaceous sediments. Because the tuffaceous sediments which underlie the basalt flows are relatively incompetent, there has been extensive landsliding in the region.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 86,740 acres that constitute the balance.

References:

Bailey, E.H., and Phoenix, D.A., 1944, Quicksilver deposits in Nevada: University of Nevada Bulletin, vol. 38, no. 5, Geology and mining series no. 41, 206 p.

Bergquist, J.R., Plouff, Donald, Turner, R.L., and Causey, J.D., 1988, Mineral resources of the Massacre Rim Wilderness Study Area, Washoe County, Nevada: U.S. Geological Survey Bulletin 1707-E, 16 p.

Bohnam, H.F., 1969, Geology and mineral deposits of Washoe and Storey Counties, Nevada: Nevada Bureau of Mines Bulletin 70, 140 p.

Causey, J.D., 1987, Mineral resources of the Massacre Rim study area, Washoe County, Nevada: U.S. Bureau of Mines Open-File Report MLA 9-87, 8 p.

Ross, C.P., 1941, Some quicksilver prospects in adjacent parts of Nevada, California, and Oregon: U.S. Geological Survey Bulletin 931-B, p. 23-37.

Rytuba, J.J., 1981, Relation of calderas to ore deposits in the western United States: Arizona Geological Society Digest, v. XIV, p. 227-236.

Mineral resources of the Massacre Rim Wilderness Study Area.

Explanation, mineral resources of the Massacre Rim Wilderness Study Area.

Name: Meadow Valley Range

Area number: NV-050-156

Size (acres): 185,744 of which 97,180 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Pampeyan and others, 1988).

Identified mineral resources (known): The Johnston and Fitchett prospect inside the study area has more than 3 million tons of indicated and inferred marginal perlite reserves (Pampeyan and others, 1988). Zeolite minerals are associated with the perlite deposits. Gypsum (Jones and Stone, 1920) and placer gold deposits (Jones and Papke, 1984) are present in the unstudied part of the area; amount of resources, if any, is unknown. Sand, gravel, and stone (quartzite and limestone) are abundant in the area, but these occurrences are not unique and other suitable deposits are closer to prospective markets.

Mineral resource potential (undiscovered): The area surrounding the Johnson and Fitchett prospect inside the northern part of the study area has high potential for perlite and moderate potential for zeolite minerals associated with the perlite; occurrences of agate, marekanite (Apache tears), and opaline rock, all traditionally of interest to mineral collectors, also are associated with the perlite and have a moderate resource potential. The Bradshaw vanadium prospect outside the west edge of the study area has 800,000 tons of black shale containing inferred subeconomic resources of cadmium, chronium, copper, molybdenum, nickel, phosphorous, silver, vanadium, and zinc that may extend down dip into the study area. There is a high potential for vanadium west of the study area and an unknown potential for vanadium immediately east of the outcrop in the study area. In the southernmost part of the study area silicified limestone at the D and D prospect contains trace amounts of silver and the Fry and Jeffers claim is on an insignificant radioactive anomaly. There is no potential for silver at the D and D prospect and no potential for uranium or thorium at the Fry and Jeffers claim.

Heavy-mineral concentrates from stream-sediment samples in the north half of the study area suggest a moderate potential area and a separate low potential area for rhyolite-hosted tin resources and a low potential for carbonate-hosted silver, copper, lead, and zinc resources. There is low potential for carbonate-hosted gold, silver, lead, and zinc resources in the southwestern part of the study area. In the southern part of the study area, an area has low potential for carbonate-hosted copper, lead, and zinc resources.

Evaporite deposits of gypsum are present adjacent to the east side of the study area but they do not extend into the area and have no resource potential there. Silica in the form of quartzite is present in the south half of the study area but has no resource potential. A small amount of ornamental stone has been quarried outside the west edge of the study area, but there is no resource potential for this stone within the area. The southern one-third of the study area has high resource potential for limestone inferred to be of high purity. The study area also has a high potential for resources of sand and gravel in the alluvial deposits. There is a moderate potential for oil and gas resources in the study area. There is no potential for geothermal resources in the study area.

Mining activity: Placer gold was reportedly recovered in 1983 by Enoch Resources from alluvial deposits on the southeastern boundary of the area (Jones and Papke, 1984). In 1972, Texaco Inc. drilled an exploratory oil and gas well in the unstudied part of the area; the well was subsequently abandoned.

Geology: The south half of the study area is underlain by faulted folded marine sedimentary rocks of Cambrian through Triassic age (see appendix for Geologic Time Chart). Limestone and dolomite are the dominant rock types, but some shale, sandstone, and siltstone are present near the top of the sedimentary sequence. In the north half of the area these rocks are overlain by volcanic rocks of Miocene age (24 to 11 million years before present, Ma), predominantly rhyolitic welded tuffs locally interlayered with rhyolitic and basaltic flows and cut by rhyolitic dikes. The sedimentary and volcanic rocks are overlapped by Miocene to Holocene nonmarine sediments.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 88,564 acres that constitute the balance. Perlite and zeolite areas should be geologically mapped in detail and sampled at close intervals to delineate total resources. This work should be complemented with selective drilling. Known gypsum and placer gold deposits in the unstudied area should be evaluated.

References

Campbell, H.W., 1987, Mineral resources of the Meadow Valley Range study area, Lincoln and Clark Counties, Nevada: U.S. Bureau of Mines Open File Report MLA 27-87, 27 p.

Heston, D.A., 1982, Geology of the Bradshaw vanadium prospect, Meadow Valley Mountains, Lincoln County, Nevada: Fort Collins, CO, Colorado State University, M.S. thesis, 106 p.

Jones, J.C., and Stone, R.W., 1920, (Deposits in) Southern Nevada, in Stone, R.W., and others, Gypsum deposits of the United States: U.S. Geological Survey Bulletin 697, p. 155-160.

Jones, R.B. and Papke, K.G., 1984, Active mines and oil fields in Nevada--1983: Nevada Bureau of Mines and Geology, Map 84, scale 1:1,000,000.

Longwell, C.R., Pampeyan, E.H., Bowyer, Ben, and Roberts, R.J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines Bulletin 62, 218 p.

Pampeyan, E.H., Blank, H.R., Jr., and Campbell, H.W., 1988, Mineral resources of the Meadow Valley Range Wilderness Study Area, Lincoln and Clark Counties, Nevada: U.S. Geological Survey Bulletin 1729-C, 24 p.

Tschanz, C.M., and Pampeyan, E.H., 1970, Geology and mineral deposits of Lincoln County, Nevada: Nevada Bureau of Mines Bulletin 73, 187 p.

Mineral resources of the Meadow Valley Range Wilderness Study Area.

Explanation, mineral resources of the Meadow Valley Range Wilderness Study Area.

Name: Million Hills

Area number: NV-050-233

Size (acres): 21,296 of which 9,599 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Bergquist and others, 1990)

Identified mineral resources (known): There are inferred subeconomic resources of copper-lead-zinc-cobalt-gold-silver-gallium-germanium on the Esperanta claims and copper-lead-zinc-cobalt-gold-silver on the Quartz claim.

Mineral resource potential (undiscovered): North of the study area in the northern Virginia mountains, deposits which contain substantial amounts of beryl-chrysoberyl have been discovered. Gypsum and anhydrite are also known to occur in this region. Copper production has occured in the Gold Bute district of Clark county, nothwest of the study area, in similar rocks offset along a left lateral strike/slip fault. Due to the similarity of rock types the area has ben assigned a low resource potential. Less than 10,000 ounces of gold have been produced from this district. Lead and zinc production has been restricted to 0.005 and 500 short tons in both the Virginia and Gold Butte districts. Thorium and rare-earth elements have also been found in the Gold Butte district, predominantly in pegmatites. The area does contain occurrences of rock containing at least 0.01 percent U_3O_8 or recognizable uranium minerals. Resource potential for gold, silver, copper, cobalt, and (or) the other forementioned deposits is low to moderate in the older granitic and metamorphic rocks.

Mining activity: The northwestern edge of the WSA is in the Gold Butte mining district. One mine, Azure Ridge, has produced a small amount of zinc, copper, and lead from within the WSA.

July 1989 BLM records show 4 active claims in the northwest part of the WSA.

Geology: The majority of this study area is cut by high-angle fault blocks that encompass thick sequences of carbonate rock from the Devonian through the Permian. Contacts between individual units are fault related. Both foreland basin or shelf rocks have been faulted against Devonian eugeosynclinal rocks and Precambrian sandstones and limestone. Similar rocks are offset to the north west along a left-lateral strike/slip fault. Approximately 5 km to the west granitic rocks intrude metamorphic rocks, predominantly gneiss and schist.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 11,697 acres that constitute the balance. The abundance of carbonate rocks in relatively close proximity to igneous rocks indicate the possibility of skarn-type mineralization within the area, specifically in the west. Detailed geologic mapping, geochemical sampling, and geophysical studies might pinpoint alteration areas which could raise the potential for precious metal deposits.

References:

Bergquist, J.R., Nowlan, G.A., Blank, H.R., Podwysocki, M., Turrin, B.D., and Causey, J.D., 1990, Mineral resources of the Million Hills Wilderness Study Area, Clark County, Nevada: U.S. Geological Survey Open-File Report

Causey, J. D., 1988, Mineral resources of the Million Hills study area, Clark County, Nevada: U.S. Bureau of Mines Open File Report MLA 34-88, 29 p.

Hewett, D. F., Callaghan, Eugene, Moore, B. N., Nolan, T. B., Rubey, W. W., and Schaller, W. T., 1936, Mineral resources of the region around Boulder Dam: U.S. Geological Survey Bulletin 871, 197 p.

Longwell, C. R., Pampeyan, E. H., Bowyer, Ben, and Roberts, R. J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines Bulletin 62, 218 p.

Smith, P. L., and Tingley, J. V., 1983, A mineral inventory of the Esmeralda-Stateline Resource Area, Las Vegas District, Nevada: Nevada Bureau of Mines and Geology Open-file Report 83-11, 173 p.

EXPLANATION

Mineral resources of the Million Hills Wilderness Study Area.

Name:	Morey
Area number:	NV-060-191
Size (acres):	21,120 of which 14,560 were studied at the request of the U.S. Bureau of Land Management.
Status of mineral surveys:	Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (John and others, 1987).
Identified mineral resources (known):	Occurrences of low-grade silver, lead, and zinc are present in the northernmost part of the study area, along South Canyon (Nos. 2-4 on fig.) and at the Bringham prospect along the eastern study area boundary (No. 5 on fig.).
Mineral resource potential (undiscovered):	The Morey Wilderness Study Area has areas of moderate and high potential for silver, lead, and zinc and low potential for copper, molybdenum, and tin. In addition, there is low potential for petroleum, natural gas, uranium, and geothermal energy.
Mining activity:	The Morey mining district is adjacent to the northern boundary of the study area. There are no patented claims inside the study area, but unpatented claims on file with the BLM as of July 1989 cover much of the northernmost part, and part of the southern tip of the study area. No production has been reported from in the study area, but the extent of the workings on the Bhum prospect (No. 3 on fig.) indicate that some ore may have been produced. Exploration in the past several years has been limited mainly to just outside and along the northern study area boundary. Companies have been looking for extensions of the Morey silver deposits and possible copper and/or molybdenum deposits, but the occurrences have proved to be uneconomic
Geology:	The Morey Wilderness Study Area is underlain by middle Tertiary silicic volcanic rocks that are mainly ash-flow tuffs. Several ages and types of faults are present in the study area, including Mesozoic thrust faults and Cenozoic high-angle normal faults.
Recommendations:	As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 6,560 acres that constitute the balance. Continued attention should be given to the study area adjacent to the Morey mining district because improvements in mineral technology and/or metal prices could again make the area a development target. Additional detailed geophysical and geochemical studies are recommended for the South Canyon area because workings and prospects are on mineralized vein systems that may extend from the Morey deposits. The extent of the veins, their interrelationship, and degree of mineralization are unknown.

References:

John, D.A., Nash, J.T., Plouff, Donald, and McDonnell, J.R., Jr., 1987, Mineral resources of the Morey and Fandango Wilderness Study Areas, Nye County, Nevada: U.S. Geological Survey Bulletin 1731-A, 19 p.

McDonnell, J.R., Jr., 1985, Mineral investigation of the Fandango (NV-060-190) and Morey (NV-060-191) Wilderness Study Areas, Nye County, Nevada: U.S. Bureau of Mines Open-File Report 61-85, 41 p.

Mineral resources of the Morey Wilderness Study Area.

Explanation, mineral resources of the Morey Wilderness Study Area.

Name: Mormon Mountains

Area number: NV-050-161

Size (acres): 162,887 of which 123,130 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Shawe and others, 1988; 1990).

Identified mineral resources (known): No mineral resources were identified in the study area. Large quantities of limestone are present throughout the study area; most of the limestone would be suitable for cement, lime, steel flux, road metal, general chemical, agricultural, paint, and filler. The remote location of the limestone precludes any but local uses because similar and better grade material may be obtained outside the area, nearer to a market place. Sand and gravel is also present throughout the area; however, similar material may be obtained outside the area.

Mineral resource potential (undiscovered): The study area has high mineral resource potential for (1) copper, lead, zinc, silver, and (or) gold in its southern part and (2) copper, lead, zinc, silver, gold, arsenic, and (or) antimony in its northern part. Part of the study area has moderate mineral resource potential for antimony. Two areas in the central part of the study area have moderate mineral resource potential for tungsten, molybdenum, and (or) tin. The remainder of the study area has low mineral resource potential for all metals. The study area has moderate energy resource potential of oil and gas, except for areas of low potential where significant hydrothermal activity has occurred. It has low mineral and energy resource potential for manganese, barite, vermiculite, coal, and geothermal energy.

Mining activity: The Viola mining district is about 15 miles north of the study area and has produced an unknown amount of silver and copper. About 11,500 tons of fluorspar were mined in 1958.

The Gourd Spring mining district is about 2 miles east of the study area. In 1929, 60 tons of manganese were mined. Tungsten prospecting began in the 1940's, but production is unknown. In recent years 300-400 placer claims have been staked on alluvial fans in the area. As of August 1989, 39 placer and 58 hard rock mining claims were on file with the BLM, but no evidence of any current mining activity was found in the area.

The Whitmore mine is located near the center of the study area. A low-angle brecciated quartz vein contains silver and copper.

The Iron Blossom prospect, about 6 miles north of the Whitmore mine, is in silicified iron oxides at the contact of Tertiary rhyolites and Paleozoic limestones. Samples contained copper, lead, and zinc. The mineral occurrences are small in size and contain low metal concentrations.

In previous years, the entire study area has been under lease or lease application for oil and gas. As of Sept. 1989, thirty one sections are under lease in the area. There is no recorded production from within the study area.

July 1989 BLM records show no claims active in the WSA.

Geology: The study area is near the south end of the Nevada-Utah section of the Basin-range tectonic province. The Mormon Mountains form a domelike structure, the core of which is ancient Precambrian crystalline rocks (see geologic time chart) that are exposed in small patches at the west edge of the study area and just south of the study area. Doming of the mountains probably was a result of intrusion of igneous rocks sometime in Mesozoic-Tertiary time. Cambrian clastic marine sedimentary rocks lie in depositional contact upon the crystalline rocks. A series of low-angle faults has episodically moved a thick section of Paleozoic marine sedimentary rocks, mostly carbonate strata, onto the older rocks. Tertiary volcanic rocks, in part also emplaced on low-angle faults, occur along the north margin of the study area. Younger high-angle faults of diverse orientations offset the low-angle faults and the rock formations.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 29,757 acres that constitute the balance.

References:

Barton, H.N., and Day, G.W., 1984, Reconnaissance geochemistry of the Mormon Mountains, Bureau of Land Management Wilderness Study Area (NV 050-0161), Lincoln County, Nevada: U.S. Geological Survey Open-File Report 84-361, 47 p.

Great Basin GEM Joint Venture, 1983, Mormon Mountains G-E-M resources area (GRA No. NV-27) technical report (WSA NV 050-0161): Reno, Nevada, Great Basin GEM Joint Venture for U.S. Bureau of Land Management contract YA-553-RFP2-1054 Open-File Report, 33 p.

Rains, R.L., 1986, Mineral Resources of the Mormon Mountains study area, Lincoln County, Nevada: U.S. Bureau of Mines Open-File Report MLA 69-86, 20 p.

Scott, D.C., 1989, Mineral investigations of an additional part of the Mormon Mountains Wilderness Study Area (NV-050-161), Clark and Lincoln Counties, Nevada: U.S. Bureau of Mines Open-File Report, 17 p.

Shawe, D.R., Blank, H.R., Jr., Wernicke, B.P., Axen, G.J., Barton, H.N., Day, G.W., and Rains, R.L., 1988, Mineral resources of the Mormon Mountains Wilderness Study Area, Lincoln County, Nevada: U.S. Geological Survey Bulletin 1729-B, 18 p.

Shawe, D.R., Blank, H.R., Jr., Wernicke, B.P., Axen, G.J., Barton, H.N., Day, G.W., and Scott, D.C., 1990, Mineral resources of the Mormon Mountains Wilderness Study Area and addition, Lincoln County, Nevada: U.S. Geological Survey Open-File Report.

Stewart, J.H., 1980, Geology of Nevada: Nevada Bureau of Mines and Geology Special Publication 4, 136 p.

Tschanz, C.M., and Pampeyan, E.H., 1970, Geology and mineral deposits of Lincoln County, Nevada: Nevada Bureau of Mines Bulletin 73, 188 p.

Mineral resources of the Mormon Mountains Wilderness Study Area.

Explanation, mineral resources of the Mormon Mountains Wilderness Study Area.

Name: Mount Grafton

Area number: NV-040-169

Size (acres): 73,216 of which 30,115 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Van Loenen and others, 1987).

Identified mineral resources (known): Identified resources within the area studied are 2,000 short tons of 0.1 percent WO_3 at the Deer Trail Mine, and 1,000,000 short tons of 0.4 percent zinc in tactite above Swartz Canyon.

Mineral resource potential (undiscovered): A high mineral resource potential exists for tungsten, zinc, and copper in tactite deposits. A moderate mineral resource potential was assigned to areas that may contain small vein and replacement deposits of one or more of the following commodities: tungsten, silver, zinc, lead, gold, and fluorite resources; potential for these commodities in all other areas is low. The study area has a low potential for oil and gas, uranium and thorium, and geothermal and clay resources.

Mining activity: Mineralized fractures in the area studied and its periphery were evaluated intermittently between the mid-1800's and the late 1970's. At various times, adits, trenches, shafts, and pits were excavated to explore for silver, gold, lead, tungsten, zinc, and copper. The only known mineral production from within the study area was in 1956, when 134 short tons of tungsten ore were produced at the Deer Trail Mine.

Geology: The wilderness study area is underlain mainly by a thick sequence (approximately 20,000 ft) of clastic and carbonate rocks that was deposited in the Great Basin during the Late Proterozoic and Paleozoic Eras (see geologic time scale on last page of this report). These rocks, mainly quartzite, shale, limestone, and dolostone, range in age from Late Proterozoic through Middle Devonian. During the late Cenozoic this thick sequence of rocks was shaped by uplift and fractured into its present form. Nearly 14,000 ft of displacement is estimated to have occurred along the major border faults responsible for the present high relief.

The southern part of the study area is relatively simple uplifted fault block tilted 35° toward the east. The northern part of the study area is characterized by many small irregularly shaped fault blocks displaying a down-to-the-north stair-stepping caused by east-west faulting. Folding is absent in these strata except where expressed as drag along the high-angle faults.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 43,101 acres that constitute the balance. Further exploration for metals in the area studied may be fruitful. Most mineralized structures on the study area periphery are in structures which are not traceable into the area. However, these sites indicate the type and size of mineralized localities that may be encountered in similar fractures within the same stratigraphic horizon in the area studied.

Metals produced from the area periphery include silver, tungsten, lead, and possibly zinc, copper, and gold. It is doubtful that production from any of these deposits exceeded 500 tons. Extensive parts of the area studied that are underlain by quartzite, carbonate rock, or shale may contain similar mineralized fractures that are covered and unevaluated. Some of the known deposits on these lands contain identified resources of zinc (5.6 million short tons of 1.1 percent Zn at Swartz Canyon), tungsten (75,000 short tons of 0.41 percent WO3 and 25,000 short tons of 0.033 percent WO3 at the Cinch Mine; 10,000 short tons of 0.33 percent WO3 and 400 short tons of 0.19 percent WO3 at the Eagle Rock Mine), and silver (10,000 short tons of 2.4 oz silver/ton and 400 short tons of 1.5 oz silver/ton at the Eagle Rock Mine; 20,000 short tons of 0.6 oz silver/ton and 40,000 short tons of 4.5 oz silver/ton at the Marich claims. Parts of the Lady Linda and the Lake Valley silver lode claim groups are within the area studied, but there are no excavations on those claims within the area.

Hydrocarbon exploration may be warranted. Oil and gas leasing in the region includes 0.2 sq mi of the area studied. Accumulated data are insufficient at present to prove or disprove the existence of hydrocarbon traps at depth below possible decollement zones. Known data are unavailable and considered proprietary by various petroleum and seismic companies. Regionally, oil traps are situated in Tertiary volcanic rocks below 4,000 ft in depth.

References:

Van Loenen, R.E., Blank, H.R., Jr., Barton, Harlan, and Chatman, M.L., 1987, Mineral resources of the Mount Grafton Wilderness Study Area, Lincoln and Churchill Counties, Nevada: U.S. Geological Survey Bulletin 1728-F, 24 p.

Mineral resources of the Mount Grafton Wilderness Study Area.

Explanation, mineral resources of the Mount Grafton Wilderness Study Area.

Name: Mount Limbo

Area number: NV-020-201

Size (acres): 23,702 of which 12,900 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Keith and others, 1986).

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): The results of these surveys indicate the existance of a zone with moderate potential for gold and silver in the southern end of the study area. Elsewhere within the study area, the potential for gold and silver resources is low. Potential for geothermal resources is low in the entire study area. The granitic and volcanic rocks found in the study area are unfavorable for the accumulation of oil and gas.

Mining activity: There are no active claims in the Wilderness Study Area (BLM records, July 1989). A large group of claims located since the mineral surveys by Rocky Mountain Minerals Inc. was abandoned in 1986. Three prospect pits and two 150- by 2-ft-deep trenches were found in the area.

Geology: The study area comprises a granodiorite pluton of Cretaceous age (63 to 138 million years before present, or Ma) (see Geolgic Time Chart, last page of report) bounded on the east and west by high-angle normal faults. Small felsic to mafic, aplitic to pegmatitic dikes intrude the pluton. Alluviated valleys flank the study area.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 10,802 acres that constitute the balance. Additional investigations may be warranted at calcareous sinter sites to determine if the sinter is related to thermal spring activity and therefore favorable for epithermal gold mineralization.

References:

Crewdson, R. A., 1974, The geology and mineral deposits of part of the Selenite Range, Pershing County, Nevada: Golden, Colorado, Colorado School of Mines, M.S. thesis, 65 p.

Keith, W. J., R. L. Turner, D. Plouff, C. M. Rumsey, 1986, Mineral resources of the Mount Limbo Wilderness Study Area, Pershing County, Nevada: U.S. Geological Survey Bulletin 1726-A, 11 p.

Rumsey, C. M., 1986, Mineral resources of the Mount Limbo Wilderness Study Area and vicinity, Pershing County, Nevada: U.S. Bureau of Mines Open-File Report 35-86, 11 p.

Mineral resources of the Mount Limbo Wilderness Study Area.

Explanation, mineral resources of the Mount Limbo Wilderness Study Area.

Name:	Mount Stirling
Area number:	NV-050-401
Size (acres):	69,650 of which 40,275 were studied at the request of the U.S. Bureau of Land Management.
Status of mineral surveys:	Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Madrid and others, 1987).
Identified mineral resources (known):	No mineral resources have been identified in the Wilderness Study Area.
Mineral resource potential (undiscovered):	Rock, stream, and soil samples form the zone of alteration associated with the Grapevine fault system are consistently anomalous in gold that is associated with arsenic mercury, thallium, and antimony. Within the zone of alteration along this fault system the geologic setting and the assemblage of anomalous elements are similar to those at known sediment-hosted disseminated gold deposits elsewhere in Nevada. This zone of alteration has a high mineral resource potential for gold in this type of deposit. Another area of high mineral resource potential for gold occurs at Gold Spring where anomalous amounts of gold are contained within shear zones in quartzite. An area of moderate resource potential for gold is present along part of the Wheeler Pass thrust where gold is associated with silicified limestone of lower plate parallel to, and just below the thrust fault. One area that crosses the range north of Gold Spring has a low mineral resource potential for lead and zinc; another area along the crest of the range south of Mt. Stirling has a low mineral resource potential for manganese and zinc; both are associated with quartz-hematite vein systems in metamorphic rocks. A third area of low mineral resource potential for copper, lead, and zinc is present at Big Timber Spring where alteration is associated with spring. An area south of Big Timer spring has an unknown mineral resource potential for gold along a poorly exposed normal fault system.
Mining activity:	Mines in the Johnnie District, about three miles west of the study area, have produced an estimated $1,966,000 in gold from quartz veins (Ivosevic, 1976). The Stirling mine, about one mile from the northwestern boundary, has been worked for gold in the past. Previous to the joint wilderness study, less than 35 claims had been located inside the WSA. July 1989 BLM records show about 95 claims active in the WSA. About 90 of these are in the northwest portion of the study area. During the 1984 investigation (Conyac), three shafts less than 20 feet deep, a 28-foot adit, and seven pits were in the study area.

Geology: The northern Spring Mountains, have rugged terrain and high relief and are composed of Late Proterozoic to Permian (about 700 to 280 Ma) siliciclastic and carbonate sedimentary strata that were deposited on the Proterozoic and paleozoic continental margin. These rocks were compressively folded and thrust faulted during the Mesozoic (about 240 to 66 Ma) and were subjected to high-angle normal faulting prior to and as part of extensional tectonism during the Tertiary (66 to 1.7 Ma). Quaternary alluvial deposits occur within the wilderness study area. Stratabound occurrences of copper-silver minerals are in quartzite, and gold exists locally in quartz veins in carbonate rocks.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 29,375 acres that constitute the balance. Further detailed mapping and sampling of rock, soil, and stream sediments is warranted to evaluate stratabound copper and silver occurrences in the vicinity of the Noonday, SMP, and Moonshine prospects. Test drilling would be required to confirm any anomalies. This exploration should be designed to include evaluation of gold-bearing quartz veins and disseminated gold occurrences near prospects along the western edge of the study area in the upper Precambrian and lower Cambrian formations. Targets of highest interest are the intersections of faults with these formations.

References:

Conyac, M. D., 1985, Mineral resources of the Mt. Stirling Wilderness Study Area, Nye and Clark Counties, Nevada: U.S. Bureau of Mines Open File Report 25-85, 18 p.

Ivosevic, S. W., 1976, Geology and ore deposits of the Johnnie district, Nye County, Nevada: Reno, Nevada, University of Nevada, M.S. Thesis, 192 p.

Madrid, R. J., R. Turner, D. W. Brickey, H. R. Blank, and M. Conyac, 1987, Mineral resources of the Mt. Stirling Wilderness Study Area, Clark and Nye Counties, Nevada: U.S. Geological Survey Bulletin 1730-B, 20 p.

Mineral resources of the Mount Stirling Wilderness Study Area.

Explanation, mineral resources of the Mount Stirling Wilderness Study Area.

Name: Muddy Mountains
Area number: NV-050-229
Size (acres): 96,170

Status of mineral surveys: This wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Bohannon and others, 1982).

Identified mineral resources (known): The Vanderbilt mine contains montmorillonite clay resources. The Anniversary mine contains about 380,000 tons marginal reserves and 2 million tons inferred resources (borate). Zeolite resources total 4.7 million tons of inferred resources averaging 84% clinoptilolite with a cation exchange capacity of 1.6 meq/g (Leszcykowski and others, 1982).

Lithium occurs in hectorite (clay) in the WSA, but no economic extraction methods occur at present.

Mineral resource potential (undiscovered): The Muddy Mountains Wilderness Study Area has high potential for deposits of calcium borates and lithium. The area has little potential for mineral deposits of metals (other than lithium). Building stone and silica sand have moderate to low potential in some places. Oil and gas potential within the study area is low.

Mining activity: The Anniversary mine, on the southern edge of the WSA, produced about 200,000 tons of borate in the 1920's. There was also limited borate production at the American Borax mine on the northeastern edge of the area between 1922 and 1924. The Vanderbilt clay deposit is located in the western portion of the WSA on two patented claims. This operation reported production of 100-200 tons/year montmorillonite clay from 1955 to 1975. The Wyatt Silica mine, just outside the northeastern WSA boundary, produced a limited amount of silica prior to 1936. The Colorock quarry, in the north part of the area, produced minor quantities of flagstone.

July 1989 BLM records show 158 lode and 18 placer claims active in the WSA. Sixty-four oil and gas leases cover about 95% of the area, with applications pending on the remaining 5%. These leases are held mainly by Amoco, Chevon, and Cities Service. A 10,300 ft exploratory oil well was drilled by Amoco Production in the Colorock area.

Geology: Sedimentary rocks of various types and ages are exposed in the Muddy Mountains Wilderness Study Area. Paleozoic rocks are mostly limestone and dolomite with lesser amounts of sandstone that were deposited in a shallow sea. Mesozoic rocks are chiefly nonmarine clastic rocks that formed in tidal flat, floodplain, fluvial, swamp, and eolian environments. Mesozoic nearshore marine rocks are also present. Tertiary rocks were deposited in a complex system of basins tha evolved during Miocene time as the Basin and Range structural province was forming. These consist of various types of lacustrine, fluvial, and alluvial clastic rocks. The Muddy Mountain thrust fault, a Late Cretaceous to early Tertiary(?) structure of regional extent dominates the central and northern parts of the study area. The thrust is probably present in the subsurface throughout the north and western parts of the study area. Several middle Tertiary to Quaternary normal faults are also present in the study area.

Recommendations: No further studies are recommended.

References:

Hewett, D. F., Callaghan, Eugene, Moore, B. N., Nolan, T. B., Rubey, W. W., and Schaller, W. T., 1936, Mineral resources of the region around Boulder Dam: U.S. Geological Survey Bulletin 871, 197 p.

Leszcykowski, A. M., Esparza, L. E., and Rumsey, C. M., 1982, Mineral investigation of the Muddy Mountains Wilderness Study Area (BLM), Clark County, Nevada: U.S. Bureau of Mines Open File Report MLA 112-82, 16 p.

Longwell, C. R., Pampeyan, E. H., Bowyer, Ben, and Roberts, R. J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines Bulletin 62, 218 p.

Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas; Mineral Potential Handbook: Nevada Mining Association, Reno, NV, unnumbered pages.

Vanderburg, W. O., 1937, Reconnaissance of mining districts in Clark County, Nevada: U.S. Bureau of Mines Information Circular 6964, 81 p.

EXPLANATION

Mineral resources of the Muddy Mountains Wilderness Study Area.

Name: Nellis
Area number: NV-050-4R-15
Size (acres): 5,718

Status of mineral surveys: This area was not studied by the U.S. Bureau of Mines or the U.S. Geological Survey.

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area. Sand and gravel occur throughout the area; data are not sufficient to evaluate the economic significance of these deposits.

Mineral resource potential (undiscovered): The Nellis Wilderness Study Area has moderate potential for undiscovered deposits of gold, silver, lead, and zinc in buried bedrock as well as for undiscovered deposits of gold in placers. The area also has moderate potential for undiscovered deposits of oil and gas.

Mining activity: There is no known mineral production from the Wilderness Study Area. North of the area, the Gass Peak mining district produced zinc, lead, silver, and gold.

July 1989 BLM mining claim records show four unpatented placer claims located in the alluvium of the area (NV-050-04R-15B). All of the area is covered by oil and gas leases. No geothermal leases are in the area (Great Basin GEM Joint Venture, 1983).

Geology: The area is underlain entirely by alluvium, there are no bedrock outcroppings.

Recommendations: This Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey. The area should be evaluated for potential sand and gravel use in the nearby Las Vegas, Nev. construction market. Recent placer claims staked in the area should be evaluated.

References:

Cornwall, H.R., and Norberg, J.R., 1978, Mineral resources of the Nellis Air Force Base and the Nellis Bombing and Gunnery Range, Clark, Lincoln, and Nye Counties, Nevada: U.S. Geological Survey and U.S. Bureau of Mines report, unpublished.

Great Basin GEM Joint Venture, 1983, Nellis/Quail Spring G-E-M Resources Area (GRA No. NV-33) technical report: Prepared for the U.S. Bureau of Land Management, Denver, Colorado, 26 p.

Longwell, C.R., Pampeyan, E.H., Bowyer, Ben, and Roberts, R.J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines Bulletin 62, 218 p.

U.S.Bureau of Land Management and U.S. Department of the Air Force, 1981, Final Environmental Impact Statement for the proposed public land withdrawal of the Nellis Air Force Bombing Range, Nye, Clark, and Lincoln Counties, Nevada: 113 p.

Vanderburg, W.O., 1937, Reconnaissance of mining districts in Clark County, Nevada: U.S. Bureau of Mines Information Circular 6964, 81 p.

EXPLANATION

Mineral resources of the Nellis Wilderness Study Area.

Name: North Black Rock
Area number: NV-020-622
Size (acres): 30,791

Status of mineral surveys: This area was not studied by the U.S. Bureau of Mines or the U.S. Geological Survey.

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): The study area has low potential for undiscovered volcanic-hosted mineral resources of gold, mercury, and silver and moderate potential for undiscovered geothermal energy resources.

Mining activity: The Blue Jack Group, located about three miles east of the study area, produced a small tonnage of copper ore in 1954 which was shipped to a Utah smelter. There are about 45 mining claims in the northeastern portion of the WSA (BLM records, July 1989). The Soldier Meadows KGRA is one mile southwest of the WSA.

Geology: The study area is part of a north-trending fault-block horst typical of the Basin and Range province. The entire study area is underlain by Tertiary silicic to mafic flows and tuffs and minor beds of tuffaceous sedimentary rocks.

Recommendations: This Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

Higgins, L. R., Earnest, D. F., and Cox, A. D., 1988, Nevada BLM Wilderness Study Areas mineral potential handbook: Nevada Mining Association, Reno, Nevada, 257 p.

Noble, D.C., Plouff, Donald, Bergquist, J.R., Barton, H.N., and Olson, J.E., 1987, Mineral resources of the Pahute Peak Wilderness Study Area, Humboldt County, Nevada: U.S. Geological Survey Bulletin 1726-C, 12 p.

Vanderburg, W. O., 1938, Reconnaissance of mining districts in Humboldt County, Nev.: U.S. Bureau of Mines Information Circular 6995, 54 p.

Willden, Ronald, 1964, General geology and mineral deposits of Humboldt County, Nevada: Nevada Bureau of Mines Bulletin 59, 154 p.

EXPLANATION

Mineral resources of the North Black Rock Wilderness Study Area.

Name: North Fork of the Little Humboldt River

Area number: NV-020-827

Size (acres): 69,683 of which 8,900 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Peterson and others, 1986).

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): The rhyolite of the Swisher Mountain Tuff, which comprises the bedrock in the study area, has low potential for mercury resources. The base of the tuff is probably near the surface. Rocks beneath the tuff are similar to those in nearby regions that locally contain disseminated gold, epithermal precious-metal veins, and anomalous amounts of uranium. No information is available as to whether there are any undiscovered subsurface deposits in the study area. There is no potential for oil and gas and potential for geothermal resources is unknown.

Mining activity: There is no evidence of any mineral-related activity, historical or recent. There are no mining claims in the area (BLM records, July 1989). There are 498 acres of oil and gas leases in the WSA .

Geology: Tertiary rhyolite, correlated with the Swisher Mountain Tuff, underlies the entire area but probably does not extend far into the subsurface. Basalt, which is tentatively correlated with the Big Island Formation, forms a thin veneer over the rhyolite in the north (Peterson and Wong, 1985a).

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 60,783 acres that constitute the balance.

References:

Higgins, L. R., Earnest, D. F., and Cox, A. D., 1988, Nevada BLM Wilderness Study Areas mineral potential handbook: Nevada Mining Association, Reno, Nevada, 257 p.

Leszcykowski, A. M., 1985, Mineral resources of the North Fork Little Humboldt Study Area, Humboldt County, Nevada: U.S. Bureau of Mines open-file report MLA 47-85, 8 p.

Peterson, J. A., Heran, W. D., and Leszcykowski, A. M., 1986, Mineral resources of the North Fork of the Little Humboldt River Wilderness Study Area, Humboldt County, Nevada: U.S. Geological Survey Bulletin 1732-A, 10 p.

Willden, Ronald, 1964, General geology and mineral deposits of Humboldt County, Nevada: Nevada Bureau of Mines Bulletin 59, 154 p.

EXPLANATION

Mineral resources of the North Fork of Little Humboldt River Wilderness Study Area.

Name: North Jackson Mountains
Area number: NV-020-606
Size (acres): 26,457

Status of mineral surveys: This area was not studied by the U.S. Bureau of Mines or the U.S. Geological Survey.

Identified mineral resources (known): The only identified mineral resources in or immediately adjacent to this WSA are iron and sand and gravel. The sand and gravel resources are suitable for use locally.

There are iron resources at the Iron King (Delong) Mine, RedBird Mine, and Black Jack Mine located near the southeastern corner of the area. These mines are all past producers, according to mineral records, and account for an estimated 3 million dollars in production.

Known metal occurrences in the area include iron, silver, copper, lead, mercury, gold, and barite.

Mineral resource potential (undiscovered): The study area has moderate potential for undiscovered mineral resources of iron in dioritic intrusions and moderate mineral resource potential for copper, gold lead, silver, and zinc in epithermal deposits related to possible volcanogenic exhalative vent zones.

Mining activity: Three miles east of the area there are four mines (Baldwin, Blue Can, Birthday, and Red Ore) with recorded mercury production.

July 1989 BLM records show 24 placer and 151 lode claims in or immediately adjacent to the WSA. Most of these claims are in the eastern and southern parts of the area. Pegasus Gold Mines had an active interest in the area as recently as 1986. Most of the currently active claims are held by small operators and are in the southern and eastern parts of the area in the Jackson Creek mining district, New Years Canyon Zone, and Happy Creek Zone.

Geology: The study area is underlain by Cretaceous to Triassic volcanic flows and volcaniclastic metasediments that are intruded by Cretaceous and Jurassic felsic to mafic stocks and plugs.

Recommendations: Continued interest in the area by large and small operators indicates some potential. This Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

Shawe F.R., Reeves R.G., and Kral V.E., Iron Ore Deposits of Northern Nevada: Nevada Bureau of Mines and Geology, Bulletin 53 part C, p. 79-128.

Sorensen, M.L., , Plouff, Donald, Turner, L.T., and Hamilton, M.M., 1987, Mineral resources of the South Jackson Mountains Wilderness Study Area, Humboldt County, Nevada: U.S. Geological Survey Bulletin 1726-B, 14 p.

Vanderburg W.O., 1938, Reconnaissance of Mining Districts in Humboldt County, Nevada: U.S. Bureau of Mines Information Circular 6995, 54 p.

Wilden R., 1964, Geology and Mineral Deposits of Humboldt County, Nevada: Nevada Bureau of Mines and Geology, Bulletin 59, 154 p.

EXPLANATION

Mineral resources of the North Jackson Mountains Wilderness Study Area.

Name: North McCullough Mountains
Area number: NV-050-425
Size (acres): 47,166

Status of mineral surveys: This area was not studied by the U.S. Bureau of Mines or the U.S. Geological Survey.

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area; however, in 1984 Tri-Delta Mining Co. mined lightweight aggregate (pumice) from their Las Vegas Rilite pit in the southwest corner of the area (T. 25 S., R. 61 E., sec. 9) (Jones and Papke, 1984). Lightweight aggregate resources probably remain near this open pit. Perlite and manganese prospects are on the northern boundary of the area; data is insufficient to determine whether resources are present at these locations.

Mineral resource potential (undiscovered): The North McCullough Mountains study area has low potential for a variety of metals that may occur in quartz veins in the volcanic rocks, including gold, silver, lead, zinc, copper, manganese, and tungsten. There is abundant sand and gravel on the east and west sides of the study area, but similar deposits are widely available outside the study area and closer to major markets; there is low potential for significant resources of these commodities in the study area. There is low potential for oil and gas, chiefly in the valley-filling sediments that flank the range (Sandberg, 1983).

Mining activity: Lightweight aggregate was mined from an open pit in the southwestern corner of the area by Tri-Delta Mining, Inc. (Jones and Papke, 1984). U.S. Bureau of Mines MILS records indicate Continental Engineering Co. held perlite claims on the northern boundary of the area, and a manganese prospect was located on the eastern flank of Black Mountain near the area boundary. An unidentified prospect (shaft symbol) is shown on the Sloan, NV 15' topographic map (T. 24 S., R. 62 E., sec. 6).

July 1989 BLM mining claim records show 90 placer and 40 lode claims in the WSA.

Geology: The study area is underlain primarily by basaltic to andesitic lava flows of Miocene age. These rocks are flanked by valley-filling Quaternary and Tertiary sediments in the basins adjacent to the range.

Recommendations: This Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines. Detailed geologic mapping and sampling of pumice and perlite deposits is needed to identify possible industrial mineral resources. A mineral study is particularly important because of the lack of specific information about prospects and mineralized structures known to be in the North McCullough Wilderness Study Area.

References:

Elevatorski, E.A. (manager), 1973, Nevada industrial minerals: MINOBRAS, Dana Point, California, 62 p.

Great Basin GEM Joint Venture, 1983, McCullough Mountains G-E-M Resources Area (GRA No. NV-36) technical report: Prepared for the U.S. Bureau of Land Management, Denver, Colorado, 34 p.

Jones, R.B. and Papke, K.G., 1984, Active mines and oil fields in Nevada--1983: Nevada Bureau of Mines and Geology, Map 84, scale 1:1,000,000.

Longwell, C.R., Pampeyan, E.H., Bowyer, Ben, and Roberts, R.J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines and Geology Bulletin 62, 218 p.

Sandberg, C.A., 1983, Petroleum potential of wilderness lands in Nevada: U.S. Geological Survey Circular 902-H, p. H1-H11.

Vanderburg, W.O., 1937, Reconnaissance of mining districts in Clark County, Nevada: U.S. Bureau of Mines Information Circular 6964, 81 p.

EXPLANATION

Mineral resources of the North McCollough Mountains Wilderness Study Area.

Name:	Owyhee Canyon
Area number:	NV-010-106
Size (acres):	21,875 of which 13,525 were studied at the request of the U.S. Bureau of Land Management.
Status of mineral surveys:	Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Foord and others, 1987).
Identified mineral resources (known):	No mineral resources have been identified within the studied part of the Wilderness Study Area. Sand and gravel occurrences in bars along the river and streams may have minor local construction uses. Volcanic rocks may be used as dimension stone, but they have no unique properties that would make them preferable to other, more accessible deposits closer to potential markets.
Mineral resource potential (undiscovered):	The Owyhee Canyon Wilderness Study Area has low potential for metals and nonmetals, oil, gas, coal, and geothermal energy.
Mining activity:	July 1989 BLM records show mining claims active in the WSA, and no mineral commodities have been produced. Oil and gas leases and lease applications cover a portion of the north end of the area. Some geophysical exploration for oil and gas may have been completed in conjunction with these leases; however, no drilling was done (Capstick and Buehler, 1986).
Geology:	The Owyhee Canyon Wilderness Study Area is located on the Owyhee Upland, and extensive volcanic plateau capped by basaltic lava flows that were erupted intermittently between about 10 and 6 million years ago. These basalts lie on 14 million year old rhyolitic tuff that outcrops in several small areas in the bottom of Owyhee Canyon.
Recommendations:	As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 8,350 acres that constitute the balance.
References:	Capstick, D.O., and Buehler, A.R., 1986, Mineral resources of the Owyhee Canyon study area, Elko County, Nevada: U.S. Bureau of Mines Open File Report MLA 12-86, 9 p. Foord, E.E. Luessen, M.J., Hovorka, D.S., Plesha, J.L., Grauch, V.J.S., Barton, Harlen, King, H.D., Capstick, D.O., Mayerle, R.T., Buehler, A.R., and Gabby, P.N., 1987, Mineral resources of the Owyhee Canyon and South Fork Owyhee River Wilderness Study Areas, Elko County, Nevada, and Owyhee County, Idaho: U.S. Geological Survey Bulletin 1719-F, 20 p.

EXPLANATION

Mineral resources of the Owyhee Canyon Wilderness Study Area.

Name: Pahute Peak

Area number: NV-020-621

Size (acres): 57,529 of which 25,200 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Noble and others, 1987).

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): Three areas are identified as having mineral resource potential, and one area has potential for geothermal resources. An area at the northwest corner of the study area has moderate resource potential for gold, silver, copper, lead, zinc, molybdenum, and tungsten. An area adjacent and partially overlapping to the south has high resource potential for gold and silver. Most of the northern two-thirds of the study area has moderate resource potential for gold and silver. An area in the southwestern part of the study area has high potential for geothermal resources. There is low potential throughout the study area for mercury and uranium resources. Minor amounts of opal and petrified wood are found in the study area, but there is no indication of resource potential.

Mining activity: There is one 300-ft adit in Copper Canyon, as well as other less extensive workings, exploring small quartz veins and poorly developed skarn zones. Nothing is known about possible production. Studies of the Copper Canyon area by the U.S. Bureau of Mines (Olson, 1986) found 15.2 and 16.6 ppm silver in two samples, and up to 8 percent zinc in seven samples. The deposit is too poorly known to have identified resources (Olson, 1986). Anomalous values of gold, silver, and arsenic were also found near a fault-controlled zone south of Copper Canyon (Olson, 1986).

There are about 70 mining claims in the WSA, mostly in the western portion (BLM records, July 1989). There are 10,334 acres of oil and gas leases. Double Hot Springs KGRA includes a small portion of the southern part of the WSA. The Soldier Meadow KGRA is about several miles northwest of the WSA.

Geology: The area is underlain largely by stightly tilted rhyolitic to basaltic volcanic rocks of Oligocene and Miocene(?) age. Some of these rocks are hydrothermally altered, whereas others were altered by reaction with groundwater. Granodiorite to quartz monzonite of Cretaceous age and metasedimentary rocks of probable Mesozoic and Paleozoic age are exposed locally in the northwestern part of the study area. A few landslide masses are present along the west side of the Black Rock Range.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 32,329 acres that constitute the balance. The Copper Canyon area should be studied in detail to determine what resources are present.

References:

Higgins, L. R., Earnest, D. F., and Cox, A. D., 1988, Nevada BLM Wilderness Study Areas mineral potential handbook: Nevada Mining Association, Reno, Nevada, 257 p.

Noble, D. C., Plouff, Donald, Bergquist, J. R., Barton, H. N., and Olson, J. E., 1987, Mineral Resources of the Pahute Peak Wilderness Study Area, Humboldt County, Nevada: U.S. Geological Survey Bulletin 1726-C, 12 p.

Olson, J. E., 1986, Mineral resources of the Pahute Peak Wilderness Study Area, Humboldt County, Nevada: U.S. Bureau of Mines Open-File Report MLA 13-86, 20 p.

Willden, Ronald, 1964, General geology and mineral deposits of Humboldt County, Nevada: Nevada Bureau of Mines Bulletin 59, 154 p.

Mineral resources of the Pahute Peak Wilderness Study Area.

Explanation, mineral resources of the Pahute Peak Wilderness Study Area.

Name: Palisade Mesa

Area number: NV-060-142/162

Size (acres): 99,550 of which 66,110 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Diggles and others, 1986)

Identified mineral resources (known): No metallic mineral or oil and gas resources were identified. Basalt and cinders in the Lunar Crater Volcanic Field are sources of crushed stone.

Mineral resource potential (undiscovered): The Palisade Mesa Wilderness Study Area has low mineral resource potential for gold, silver, copper, lead, and manganese associated with caldera collapse. There is no evidence to indicate that alteration or mineralization of older collapse structures in the study area has taken place. This geologic environment is permissive for epithermal gold-silver-copper-lead-manganese mineralization similar to that occasionally associated with caldera fracture systems elsewhere in Nevada. However, McKee (1979) points out that such mineralization is usually the result of later hydrothermal-fluid circulation taking place along the pre-existing structure. There is low potential for oil and gas resources.

Mining activity: No mining claims are present and no evidence of mining activity or prospecting was observed in the study area.

Geology: Silicic volcanic rocks of Tertiary age, basaltic flows of Tertiary and Quaternary age, and sediments of Tertiary and Quaternary age are the dominant age are the dominant stratigraphic units of the Palisade Mesa Wilderness Study Area. The oldest rocks in the study area are 27 to 7 Ma (Ekren and others, 1971) and comprise thick sequences of felsic ash-flow tuffs. These are overlain by basaltic flows of the Lunar Crater volcanic field that range in age from 3.8 to 0.13 Ma (Turrin and others, 1985). About one third is covered with alluvium and colluvium deposited on pediment surfaces and with valley-fill, lake, and landslide deposits. There are two inferrred caldera boundaries within and near the wilderness study area:

The Pancake Range/Williams Ridge-Hot Creek Valley caldera boundary (Ekren and others, 1976), which lies outside of and encircles the wilderness study area; and the more striking structure known as The Wall, which Scott (1969) mapped at the edge of Lunar Lake caldera.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 33,440 acres that constitute the balance.

References:

Diggles, M.F., Nash, J. Thomas, Ponce, D.A., Donald Plouff, and Kness, R.F., 1986, Mineral resources of the Palisade Mesa and The Wall Wilderness Study Areas, Nye County, Nevada: U.S. Geological Survey Bulletin 1731-B, p. B1-B12.

Ekren, E.B., Anderson, R.E., Rogers, C.L., and Noble, D.C., 1971, Geology of Northern Nellis Air Force Base Bombing and Gunnery Range, Nye County, Nevada: U.S. Geological Survey Professional Paper 651, 91 p.

Ekren, E.B., Bucknam, R.C., Carr, W.J., Dixon, G.L., and Quinlivan, W.D., 1976, East-trending structural lineaments in central Nevada: U.S. Geological Survey Professional Paper 986, 16 p.

Ekren, E.B., Rogers, C.L., and Dixon, G.L, 1973, Geologic and Bouguer gravity map of the Reveille Quadrangle, Nye County, Nevada: U.S. Geological Survey Miscellaneous Geologic Investigations Map I-806, scale 1:48,000.

Kness, R.F., 1985, Mineral investigation of Palisade Mesa and The Wall Wilderness Study Areas, Nye County, Nevada: U.S. Bureau of Mines Open-File Report MLA 26-85, 27 p.

McKee, E.H., 1979, Ash-flow sheets and calderas: their genetic relationship to ore deposits in Nevada, in Chapin, C.E., and Elston, W.E., eds., Ash-flow tuffs: Seological Survey America Special Paper 180, p. 205-211.

Scott, D.H., 1969, Geology of the southern Pancake Range and Lunar Crater volcanic field, Nye County, Nevada: unpublished Ph.D. thesis, University California-Los Angeles, 128 p.

Scott, D.H., and Trask, N.J., 1971, Geology of the Lunar Crater volcanic field, Nye County, Nevada: U.S. Geological Survey Professional Paper 599-I, 22 p.

Snyder, R.P., Ekren, E.B., and Dixon, G.L., 1972, Geologic map of the Lunar Crater quadrangle, Nye County, Nevada: U.S. Geological Survey Miscellaneous Geologic Investigation Map I-700, scale 1:48,000.

Turrin, B.D., Renne, P.R., and Dohrenwend, J.C., 1985, Temporal trends in the chemical evolution of megacryst-bearing, subalkaline-alkaline basaltic lavas from the Lunar Crater volcanic field, Nye County, Nevada: [abs] Geological Society of America Abstracts with Programs, v. 17, n. 6, p. 14.

Mineral resources of the Palisade Mesa Wilderness Study Area.

Explanation, mineral resources of the Palisade Mesa Wilderness Study Area.

Name: Park Range
Area number: NV-040-154
Size (acres): 47,268 of which 46,831 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Brooks and others, 1987).

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area.

Extensive areas of sand and gravel occur within the WSA. However, the distance to markets combined with the abundance of these commodities in the region prevent these materials from being classified as identified resources.

Mineral resource potential (undiscovered): The mineral resource potential for undiscovered gold, silver, mercury, and arsenic is moderate in the altered, brecciated, and faulted sedimentary rocks exposed in the northern part of the study area and extending north of the study area boundary (fig. 1). However, the mineral resource potential for these metals in the rest of the study area is low based on the absence of secondary silicification and hydrothermal alteration in the Tertiary volcanic rocks that constitute most of the study area. The mineral resource potential for all other metals in the study area is also low. The resource potential for oil and gas and geothermal energy is low. However, oil and gas leases extend into the northern part of the study area.

Mining activity: No production has been reported from the WSA. There was some geochemical and geological exploration occurring in the area in 1989.

July 1989 BLM records show 107 claims in the area. These were located by three major gold mining companies and several individuals. The companies are Lana Resources U.S. Incorporated, Asarco Incorporated, and Amelsco Exploration Incorporated.

Geology: Tertiary (see geologic time chart) volcanic rocks that include intermediate-composition lavas and ash-flow tuffs constitute most of the rock exposed in the Park Range. Paleozoic sedimentary rocks that have been faulted and silicified and contain anomalous concentrations of gold, silver, arsenic, and mercury are exposed in a small, wedge-shaped area in the northern part of the wilderness study area.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 437 acres that constitute the balance. The northern part of the study area warrants additional study. Target areas should be carefully mapped and sampled in detail. Areas having anomalous values of gold, silver, arsenic, or mercury could be further delineated by drilling.

References:

Brooks, W.E., Tucker, R.E., Goodhue, C., Day, G.W., Plouff, D., Duval, J.S., Johnson, F.L., and Benjamin, D.A., 1987, Mineral Resources of the Park Range Wilderness Study Area, Nye County, Nevada: U.S. Geol. Survey Bull. 1731-F, 9 p.

Hose, R.K., 1983, Geologic Map of the Cockalorum Wash Quadrangle, Eureka and Nye Counties, Nevada: U.S. Geol. Survey Miscellaneous Investigations Series Map I-1410.

Johnson, F. L., and Benjamin, D. A., 1986, Mineral Resources of the Park Range Wilderness Study Area, Nye County, Nevada: U.S. Bureau of Mines Open File Report MLA 25-86, 13 p.

Kleinhampl, F.J. and Ziony, J.I., 1984, Mineral Resources of Northern Nye County, Nevada: Nevada Bureau of Mines and Geology Bull. 99 B, 243 p.

EXPLANATION

Mineral resources of the Park Range Wilderness Study Area.

Name: Parsnip Peak
Area number: NV-040-206
Size (acres): 88,175 of which 53,650 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Toth and others, 1987).

Identified mineral resources (known): An inferred resource of 4 million tons of perlite was calculated for outcrops along the western boundary of the study area. Densities of expanded perlite samples from these outcrops range from 3.9 to 8.2 pounds per cubic foot which should produce an acceptable concrete and plaster aggregate.

Mineral resource potential (undiscovered): A small area of limestone and dolomite on the western side of the wilderness study has high mineral resource potential for arsenic, antimony, mercury, and gold. The rest of the Parsnip Peak Wilderness Study Area has low mineral resource potential for metals, oil and gas, coal, and geothermal energy (fig. 1). The mineral resource potential for perlite is moderate in the rhyolite volcanic rock that occurs along the western side of the study area.

Mining activity: In July 1984, mining activity within the WSA consisted of assessment work on two groups of claims, the Blue Rock placer claims and the Gold Tower lode claims. Over 250,000 tons of perlite have been produced by open-pit methods from the Hollinger pit, approximately 1 mi west of the WSA. This mine was inactive in July 1984.

Geology: The study area is along the eastern margin of the Basin and Range phsiographic province and is within the Blue Ribbon lineament of Rowley and others (1978). A thick section of Miocene (for geologic ages see the geologic time chart on the last page of this report) silicic volcanic rocks underlies the central and western parts of the area; the section consists of the Bauers and Swett Tuff Members of the Condor Canyon Formation, overlain by ash-flow tuffs and rhyolite flows of the Blawn Formation. Lake sediments of the Pliocene panaca Formation occur along the east side of the area and consist of flat-lying tuffaceous siltstone, mudstone, and fine-grained sandstone, mudstone, and fine-grained sandstone. Extensive colluvial deposits of Quaternary age are developed along the eastern and western flanks of the area. A small outcrop of altered Cambrian limestone and dolomite occurs along a fault on the western margin of the area.

Normal faults cross the study area and tend mostly northwest, although a few north-trending faults are present. Offsets range from a few tens of feet to several hundred feet. none of the faults cut Quaternary deposits.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 34,457 acres that constitute the balance. More surface and subsurface sampling is needed to determine if a gold or silver resource exists on the Gold Tower claims.

References:

Cochran, K.L., 1951, Perlite resources, Meadow Valley Wash area, Clark and Lincoln Counties,Nevada; Beaver and Milland Counties, Utah: Union Pacific Railroad Company, 24 p.

Gese, D.D., 1985, Mineral resources of the Parsnip Peak Wilderness Study Area (NV-040-206),Lincoln County, Nevada: U.S. Bureau of Mines Open-File Report MLA 42-85, 22 p.

Toth, M.I., Stoneman, R.G., Blank, H.R., and Gese, D.D., 1987, Mineral resources of the Parsnip Peak Wilderness Study Area, Linclon County, Nevada: U.S. Geological Survey Bulletin 1728-D, 13 p.

Tschanz, C.M., and Pampeyan, E.H., 1970, Geology and mineral deposits of Lincoln County,Nevada: Nevada Bureau of Mines Bulletin 73, 188 p.

Wallace, A.R., Turner, R.J., Grauch, V.J.S., Plesha, J.L., and U.S. Bureau of Mines, 1987, Mineral resources of the Rough Hills Wilderness Study Area, Elko County, Nevada: U.S. Geological Survey Bulletin 1725-D, 10 p.

Mineral resources of the Parsnip Peak Wilderness Study Area.

Explanation, mineral resources of the Parsnip Peak Wilderness Study Area.

Name:	Pigeon Spring
Area number:	NV-060-350
Size (acres):	3,575
Status of mineral surveys:	This area was not studied by the U.S. Bureau of Mines or the U.S. Geological Survey.
Identified mineral resources (known):	No mineral resources have been identified in the Wilderness Study Area.
Mineral resource potential (undiscovered):	There is moderate mineral resource potential for placer gold in old stream channels in the alluvium near Cucomungo Spring on the eastern edge of the area. The area has low potential for skarn-related talc, tungsten and molybdenum mineralization in the contact zone between the Mesozoic granitic rocks and the Precambrian carbonate rocks.
Mining activity:	There are no active mines within the WSA but much of the area is within the Sylvania mining district. July 1989 BLM mining records show 120 active and 99 inactive claims within or adjacent to the WSA.
Geology:	Most of the area is underlain by Jurassic granitic rock of the Sylvania pluton. This granitic rock intrudes Precambrian metasedimentary rocks that are mostly dolomite or limestone. Locally skarns are formed at this contact. Late Tertiary or Quaternary basalt lava flows lie on the granite or limestone in the NE part of the area.
Recommendations:	Shallow pits in the alluvium might define old gravel filled channels with placer gold. The contact between alluvium and bedrock might be defined by shallow low energy seismic techniques. This Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.
References:	Great Basin GEM Joint Venture, 1983, Pidgeon Spring G-E-M Resources Area (GRA No. NV.-20) Technical Report (WSA NV-050-0350): Prepared for the U.S. Bureau of Land Management (contract YA-553-RFP2-1054), 28 p. McKee, E.H., 1968, Geology of the Magruder Mountain area, Nevada-California: U. S. Geological Survey Bulletin 1251-H, 40 p. McKee, E.H., 1985, Geologic map of the Magruder Mountain Quadrangle, Esmeralda County Nevada, and Inyo County, California: U.S. Geological Survey GQ-1587, Scale 1:62,500. Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: unpublished report.

EXPLANATION

Mineral resources of the Pigeon Spring Wilderness Study Area.

Name: Pine Creek
Area number: NV-050-414/NV-000-ISA2
Size (acres): 24,000

Status of mineral surveys: This wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Bohannon and Morris, 1983).

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): As of 1988, there were 12 oil and gas leases that covered about 95% of the wilderness study area, and applications for leases were pending for the remaining 5%. The area is considered to have low potential for oil and gas in Paleozoic carbonate and sandstone strata Evidence suggests that mineralizing fluids did not migrate along thrust faults into this area from the nearby Goodsprings mining district, and there is no evidence of potential for metallic mineral resources in the study area. Gypsum occurs in the study area, but because of its great depth (5000 ft) and the available nearby gypsum, the area is considered to have no potential for gypsum resources (Bohannon and Morris, 1983).

Mining activity: There are no known active mines within the WSA. The Goodspring mining district is 12 miles south of the WSA. The Blue Diamond mine, about 5 miles east of the WSA, produced gypsum.

July 1989 BLM records show 52 active and 10 inactive claims within or adjacent to the WSA.

Geology: The study area is situated in the rugged Sandstone Bluffs area of the Spring Mountains west of Las Vegas. Geologically, the area consists of a relatively undeformed series of Paleozoic sedimentary strata. The section includes rocks of Cambrian through Permian age, with only the Silurian missing. Rock types include marine-carbonate rocks (limestone and dolomite), nonmarine limestone, nonmarine clastic and gypsiferous rocks, and eolian sandstone. The sedimentary strata have been broken by a series of normal and thrust faults (Bohannon and Morris, 1983).

Recommendations: No further work is recommended.

References:

Bohannon, R.G., and Morris, R.W., 1983, Geology and mineral resources of the Red Rocks Escarpment Instant Study Area, Clark County, Nevada: U.S. Geological Survey Miscellaneous Field Studies Map MF-1522.

Burchfiel, B.C., Fleck, R.J., Secor, D.J., Vincelette, R.R., and Davis, G.A., 1974, Geology of the Spring Mountains, Nevada: Geological Society of America Bulletin, v.85, p 103-1022.

Great Basin GEM Joint Venture, 1983, La Madre Mountains/Pine Creek G-E-M Resources Area (GRA No. NV.-32) Technical Report (WSAs NV-050-0412 and 050-0414): Prepared for the U.S. Bureau of Land Management (contract YA-554-RFP2-1054): 34 p.

Hewett, D.F., 1931, Geology and ore deposits of the Goodsprings quadrangle, Nevada: U.S. Geological Survey Professional Paper 162, 172 p.

Longwell, C.R., Pampeyan, E.H., Bowyer, Ben, and Roberts, R.J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines Bulletin 62, 218 p.

Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: unpublished report.

EXPLANATION

Mineral resources of the Pine Creek Wilderness Study Area.

Name: Pole Creek
Area number: NV-020-014A
Size (acres): 12,969

Status of mineral surveys: This area has not been studied by the U.S. Bureau of Mines or the U.S. Geological Survey.

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area.

Extensive areas of rock and sand and gravel occur within the WSA. However, the distance to markets combined with the abundance of these commodities in the region prevent these materials from being classified as identified resources.

Mineral resource potential (undiscovered): The Pole Creek Wilderness Study Area has moderate mineral resource potential for gold, silver, and lead in vein deposits. There is low mineral resource potential for copper in pyrrhotite and chalcopyrite as well as for traces of nickel.

Mining activity: The Wild Horse Mine is a past producer of gold and silver. Copper and nickel values have been reported from the Gabbro property, but no production is known.

July 1989 BLM records show 13 lode and 1 placer claim in the WSA.

Geology: The Pole Creek Wilderness Study Area, in the Fox Range, is underlain by metamorphosed Triassic and Jurassic rocks of the Nightingale Sequence in the center of the study area. These rocks consist of metamorphosed sedimentary rocks, slate, phyllite, hornfels, calcsilicate hornfels, tactite, recrystallized limestone and dolomite, quartzite and schist. The Nightingale Sequence is intruded in the east by Cretaceous granodiorite that is medium to coarse grained with plagioclase, microcline, quartz, hornblende, and biotite. The Miocene Pyramid Sequence, part of the Hartford Assemblage, overlies much of the area. This sequence consists of basalt, andesite, and dacite flows, flow breccias, and mud-flow breccias. It is commonly propylitized and locally bleached. There are upper Miocene to Pliocene basalt flows that crop out in the western side of the study area.

Recommendations: The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

Bonham, H.F., Jr., 1969, Geology and mineral deposits of Washoe and Storey Counties, Nevada, with a section on industrial rock and mineral deposits by K.G. Papke: Nevada Bureau of Mines and Geology Bulletin 70, 140 p.

Bonham, H.F. and Papke, K.G., 1969, Geology and Mineral Deposits of Washoe and Storey Counties, Nevada: Nevada Bureau of Mines and Geology Bull. 70, 140 p.

Overton, T.D., 1947, Mineral Resources of Douglas, Ormsby and Washoe Counties: Nevada Bureau of Mines and Geology Bull. 46, 91 p.

EXPLANATION

Mineral resources of the Pole Creek Wilderness Study Area.

Name:	Poodle Mountain
Area number:	NV-020-012
Size (acres):	142,050
Status of mineral surveys:	This area has not been studied by the U.S. Bureau of Mines or the U.S. Geological Survey.
Identified mineral resources (known):	No mineral resources have been identified in the Wilderness Study Area. Extensive areas of sand and gravel occur within the WSA. However, the distance to markets combined with the abundance of these commodities in the region prevent these materials from being classified as identified resources.
Mineral resource potential (undiscovered):	The mineral potential of the Poodle Mountain area is low. Locally in the southern part of the area, metamorphic rocks intruded by Mesozoic granitic rocks are favorable for the occurrence of base and previous metal deposits. Elsewhere, a low potential exists for uranium, lithium, borates, or diamonite in Tertiary sedimentary rocks, and for epithermal gold deposits near Tertiary rhyolite intrusive centers. A low potential for geothermal energy exists near hot-water springs in the southern part of the area.
Mining activity:	The Last Stand claim is an inactive titanium-iron placer operation in the WSA. Production is not known. The Copper King is an inactive copper-tungsten claim. No production is reported from it. July 1989 BLM records show 40 claims in the WSA. The Great Eagle claim block is for uranium; the commodity of interest on the other claims in unknown.
Geology:	Most of the area is covered by late Tertiary olivine basalt flows erupted from several centers, including a shield volcano that forms Poodle Mountain. Along the flanks of the area patches of sedimentary rock and associated tuff underlie the basalt. In the southern part of the area are relatively small outcrops of Paleozoic or Mesozoic metasedimentary and metavolcanic rocks intruded by Cretaceous granite.
Recommendations:	Geophysical studies are needed to determine the thickness of the basalt flows, and the feasibility of exploring for hidden deposits below the basalt. Geochemical sampling of pre-Tertiary metamorphic and granitic rocks in the southern part of the area and of Tertiary sedimentary rocks on the flanks of the area are needed to fully evaluate the mineral resource potential. The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.
References:	Bonham, H. F., 1969, Geology and mineral deposits of Washoe and Storey Counties, Nevada: Nevada Bureau of Mines and Geology Bulletin 70, 140 p.

EXPLANATION

Mineral resources of the Poodle Mountain Wilderness Study Area.

Name:	Pueblo Mountains
Area number:	NV-020-642/OR-002-081
Size (acres):	69,310 of which 41,315 were studied at the request of the U.S. Bureau of Land Management.
Status of mineral surveys:	Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Roback and others, 1987).
Identified mineral resources (known):	Mineral resources within and near the WSA include vein and disseminated gold (exact tonnage data not available), disseminated copper and associated molybdenum (drill data unavailable), vein copper, geothermal energy, zeolites, diatomite, sand and gravel, and stone. At least 1000 tons each of zeolite and diatomite, and several thousand tons of sand and gravel and stone resources occur in or within one mile of the WSA.
Mineral resource potential (undiscovered):	There is high potential for silver and mercury resources in altered rocks located along two northwest-trending fault zones that cross the east boundary of the study area; moderate potential for gold, silver, copper, mercury, and molybdenum resources in quartz veins along a fault near the east boundary of the study area; low potential for silver, zinc, mercury, and molybdenum resources in intermediate flows located in the central part of the study area; and low potential for undiscovered silver and mercury in silicic tuff. The eastern part of the study area has low potential for copper, lead, and zinc resources in metavolcanic and metasedimentary rocks; and the northeast part of the study area has low potential for mercury resources in mafic flows. The resource potential for zeolites, diatomite, oil, gas, and geothermal energy is considered low in the study area.
Mining activity:	The Pueblo Mining District is situated within and east of the east half of the WSA. Prospecting and mining began in 1894 and at least 66 mines and prospects, encompassing more than 600 lode mining claims, have been located with over 200 active claims (BLM records, July 1989). Disseminated and vein gold, and mercury are commodities of primary interest; vein copper and porphyry copper/molybdenum deposits are also of interest. The southern part of the study area was drilled, in the mid-1970's, for a porphyry copper deposit. Current exploration in and near the WSA for disseminated gold includes at least four mining companies with active claim blocks (Inspiration Development Co., ECM Inc., Lake Fork Resources, and Red Arrow Resources); numerous prospects are also active. At least 17 other mining companies have examined the area in 1989. Non-metallic mineral commodities explored for include zeolite, diatomite, sand and gravel, and stone.

Mineral production includes minor placer gold, less than 25 oz of lode gold, one rail car load of copper ore, and less than 500 lbs of mercury. Minor quantities of zeolites have been produced.

Disseminated gold exploration has focused on areas of structural deformation, caldera environments, rhyolite plugs and flows, areas with historic base or precious metal production or mercury occurrences, and favorable volcanic lithologies.

Geology: The Pueblo Mountains comprise part of a north-trending fault block in the northwestern Basin and Range physiographic province. The east flank of the Pueblo Mountains is very steep, while the west flank dips gently to the west. Van Horn and Little Cottonwood Creeks divide the range into two parallel, north-trending crests. Metamorphosed volcanic, plutonic, and sedimentary rocks of Jurassic age are the oldest rocks in the range. They are intruded by a granodioritic pluton of probable Cretaceous age. The pre-Tertiary rocks are overlain unconformably by Tertiary sedimentary and volcanic rocks.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 27,995 acres that constitute the balance. Detailed examination of both the western and eastern slope of the Pueblo Mountain range to evaluate reported gold anomalies; evaluate the eastern slope of the range for lithium, uranium, or molybdenum associated with the nearby Pueblo Caldera; examine the prospects and alteration in the south end of the WSA for gold, or base metals, especially porphyry copper; and additional examination of the western slope for additional diatomite and zeolite occurrences.

References:

Brooks, H. C., 1963, Quicksilver in Oregon: Oregon Department of Geology and Mineral Industries Bulletin 55, 223 p.

Gray, J. J., Peterson, N. N., Clayton, Janine, and Baxter, Gary, 1983, Geology and mineral resources of 18 BLM wilderness study areas, Harney and Malheur Counties, Oregon: Oregon Department of Geology and Mineral Industries OFR O-83-2, 106 p.

Hyde, John, 1979, An Overview of Geothermal Exploration and Development in Nevada, in Newman, G.,W., and Goode, H.D., eds., Basin and Range Symposium and Great Basin Field conference: Rocky Mountain Association of Geologists, Denver, Colorado, p. 381-388.

Munts, S. R., and Willett, S. L., 1987, Mineral Resources of the Pueblo Mountains Study Area, Harney County, Oregon and Humboldt County, Nevada: U.S. Bureau of Mines Open-File Report MLA 08-87, 40 p.

Newton, V. C., 1982, Geology, energy, and minerals resources assessment, BLM Region I, Columbia Plateau: prepared for TerraData, 7555 West Tenth Avenue, Lakewood, CO, 17 p.

Roback, R. C., Vander Muelen, D. B., King, H. D., Plouff, Donald, Munts, S. R.,and Willett, S. L., 1987, Mineral Resources of the Pueblo Mountains Wilderness Study Area, Harney County, Oregon, and Humboldt County, Nevada: U.S. Geological Survey Bulletin 1740-B, 30 p.

Ross, C. P., 1942, Quicksilver deposits in the Steens and Pueblo Mountains southern Oregon: U.S. Geological Survey Bulletin 931-J, p. 227-258.

Williams, Howell, and Compton, R. R., 1953, Quicksilver deposits of Steens Mountain and Pueblo Mountains, southeast Oregon: U.S. Geological Survey Bulletin 995-B, 381 p.

Mineral resources of the Pueblo Mountains Wilderness Study Area.

Explanation, mineral resources of the Pueblo Mountains Wilderness Study Area.

Name:	Quail Springs
Area number:	NV-050-411
Size (acres):	12,145
Status of mineral surveys:	The area was not studied by the U.S. Bureau of Mines or the U.S. Geological Survey.
Identified mineral resources (known):	No mineral resources have been identified in the Wilderness Study Area. However, the area is mapped as Quaternary alluvial fill and Las Vegas Formation. It may be suitable for sand and gravel resources.
Mineral resource potential (undiscovered):	In the sedimentarty sequence the potential for diatomite, gypsum and anhydrite is low. The potential for commercial-grade sand and gravel is low to moderate. Geothermal and oil and gas potential in the area is low.
Mining activity:	July 1989 BLM records show 18 placer claims, which were staked in the WSA in 1971 by Vega, Inc. It probable that they were for sand and gravel.
Geology:	Approximately 80% of the study area is composed of Quaternary beach sands and sand dune deposits; the remaining 20% being eroded alluvial-flat, playa, and marsh deposits. Parallelling the axis of the valley is an inferred right latteral strike-slip fault.
Recommendations:	Detailed geologic mapping, geochemical sampling, and geophysical studies would add greatly to the understanding of the resource potential of this area. This Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.
References:	Great Basin GEM Joint Venture, 1983, Nellis/Quail Spring G-E-M resources area (GRA no. NV-35) technical report (WSA's NV-050-0411, 050-04R-15A, B, and C): Prepared for the U.S. Bureau of Land Management, contract YA-553-RFP2-1054, 33 p. Longwell, C. R., Pampeyan, E. H., Bowyer, Ben, and Roberts, R. J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines Bulletin 62, 218 p.

EXPLANATION

Mineral resources of the Quail Springs Wilderness Study Area.

Name: Queer Mountain
Area number: NV-060-354
Size (acres): 81,550

Status of mineral surveys: This area was not studied by the U.S. Bureau of Mines or the U.S. Geological Survey.

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): The northern part of the Queer Mountain area has a moderate potential for gold vein deposits in granitic rocks and in flanking metamorphosed shale and limestone. A low potential for tungsten skarns exists in metamorphosed limestone near contacts with granitic rocks in the northern part of the area. The central and southern part of the area is underlain mainly by a Tertiary tuff that is probably too thick to allow for exploration of potential targets in underlying rocks.

Mining activity: A placer gold prospect, Oriental Wash, and a lode-disseminated gold prospect, Silvia mine, lie within the study area. The Juanita gold prospect lies in the adjacent Little Sand Springs, CA, WSA. The Independence group uranium prospect is located near the north boundary and exploration and production has occurred in the Gold Mountain/Tokop area which extends into the northern part of the WSA.

Geology: The northern part of the Queer Mountain area is underlain by Mesozoic granitic rocks and flanking metamorphosed shale and limestone. These rocks are overlain by a thick Tertiary tuff that covers most of the central and southern part of the area. The tuff is broken by widely spaced high-angle normal faults and is locally covered by Tertiary or Quaternary basalt flows.

Recommendations: Geochemical sampling in the northern part of the area is desirable to evaluate the potential for quartz vein gold deposits. Geophysical studies are necessary to determine the thickness of the tuff in the central and southern part of the area, and to determine the feasibility of exploring for hidden deposits below the tuff. The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

Albers, J. P., and Stewart, J. H., 1972, Geology and Mineral Deposits of Esmeralda County, Nevada: Nevada Bureau of Mines and Geology Bulletin 78, 80 p.

Garside, L. J., 1973, Radioactive mineral occurrences in Nevada: Nevada Bureau of Mines and Geology Bulletin 81, p. 53.

Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: Reno, Nevada,unnumbered pages.

Wrucke, C. T., Marsh, S. P., and Miller, M. S., 1985, Reevaluation of the mineral resource potential of part of the Little Sand Springs Wilderness Study Area, Inyo County, California: U.S. Geological Survey Open-File Report 85-215, 4 p.

Wrucke, C. T., Werschky, R. S., Rains, G. L., Blakely, R. J., Hoover, D. B., and Miller, M. S., 1984, Mineral resources and mineral resource potential of the Little Sand Springs Wilderness Study Area, Inyo County, California: U.S. Geological Survey Open-File Report 84-557, 20 p.

EXPLANATION

Mineral resources of the Queer Mountain Wilderness Study Area.

Name: Rawhide Mountain
Area number: NV-060-059
Size (acres): 64,360

Status of mineral surveys: This area was not studied by the U.S. Bureau of Mines or the U.S. Geological Survey.

Identified mineral resources (known): No mineral resources have been identified within the Wilderness Study Area; however, mineral resource data are not adequate to assess possible ore body extensions into the area from mines on or near the Wilderness Study Area boundary.

Mineral resource potential (undiscovered): There is moderate potential for silver-lead-zinc replacement and fissure mineralization in fault zones intruded by silicic dikes along the northeastern edge of the area near the Tybo district. There is low potential for geothermal energy. There is low potential for oil and gas. There is low potential for industrial materials.

Mining activity: The Rawhide Wilderness Study Area is in the Tybo mining district, one of the principal mining districts in Nye County. Gold, silver, lead, and zinc were the main commodities produced from this district.

U.S. Bureau of Mines MILS records indicate 14 mines are located on or near the WSA boundary. July 1989 BLM records show 551 active lode claims in the WSA.

Exploration activity by Cyprus Minerals Corp., Gavilan Minerals Inc., and Nassau Ltd. is centered about 3 miles southwest of Dean Spring. Many claims are also located around and southeast of Rawhide Mountain. Mineral exploration activity has persisted in the Rawhide area for many years. Oil and gas leases are present along the east and west margins of the area (U.S. Bureau of Land Management, 1987)

Geology: The central part of the area is underlain by Paleozoic sedimentary rocks (mainly carbonates) that are overlain and faulted against Tertiary volcanic rocks on both the east and west sides of the area. The volcanic rocks are dominantly comprised of silicic ash-flow tuffs but also include andesitic rocks and silicic dikes. The westernmost parts of the area are covered by Quaternary alluvium.

Recommendations: Additional geologic mapping and geochemical sampling are required to determine if mineralization in the Tybo district extends into the area. This Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey. A mineral study is particularly important because of the lack of specific information about prospects and mineralized structures known to be in the Rawhide area.

References:

Couch, B.F., and Carpenter, J.A., 1943, Nevada's metal and mineral production (1859-1940): University of Nevada Bulletin, v. 37, no. 4, 159 p.

Ferguson, H.G., 1933, Geology of the Tybo district, Nevada: University of Nevada Bulletin, v. 20, no.3, 61 p.

Kleinhampl, F.J., and Ziony, J.I., 1984, Mineral resources of northern Nye County, Nevada: Nevada Bureau of Mines and Geology Bulletin 99B, 243 p.

Kleinhampl, F.J., and Ziony, J.I., 1985, Geology of northern Nye County, Nevada: Nevada Bureau of Mines and Geology Bulletin 99A, 172 p.

Kral, V.E., 1951, Mineral resources of Nye County, Nevada: University of Nevada Bulletin, v. 45, no. 3, 223 p.

Quinlivan, W. D., and Rogers, C. L., 1974, Geologic map of the Tybo quadrangle, Nye County, Nevada: U.S. Geological Survey Miscellaneous Investigations Map I-821, scale 1:48,000.

U.S. Bureau of Land Management, 1987, Final Environmental Impact Statement, wilderness recommendations for the Tonopah Resource Area, Nevada, 333 p.

EXPLANATION

Mineral resources of the Rawhide Mountain Wilderness Study Area.

Name:	Red Spring
Area number:	NV-010-091
Size (acres):	7,847
Status of mineral surveys:	This area was not studied by the U.S. Bureau of Mines or the U.S. Geological Survey.
Identified mineral resources (known):	No mineral resources have been identified within the Wilderness Study Area.
Mineral resource potential (undiscovered):	The area excluding the Pennsylvanian and Permian conglomerate has moderate resource potential for petroleum.
Mining activity:	There are no known active mines within the WSA. July 1989 BLM records show 15 active claims within or adjacent to the southwest corner of the WSA.
Geology:	Most of the area is covered by late Cenozoic sedimentary strata. These weakly consolidated sediments accumulated in fresh water basins and contain a large proportion of volcanic ash. The Cenozoic rocks overlie Permian and Pennsylvanian conglomerates and pebbly limestones.
Recommendations:	Seismic studies should be make to determine the thickness the Cenozoic strata and the configuration of the pre-Cenozic structural surface. Drilling will be necessary to discover petroleum if a sedimentary or structural target is defined. This Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.
References:	Matthews, G. W. and Blackburn, W. H., 1983, Cedar Ridge Gem Resource Area (NV-010-05), Elko County, Nevada: TERRADATA, (BLM Contract No. YA-553-CT2-1042). Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: unpublished report. Sandberg, C.A., 1982, Petroleum potential of wilderness lands, Nevada: U.S. Geological Survey Miscellaneous Investigations Series Map I-1542. Sandberg, C.A., 1983, Petroleum potential of wilderness lands in Nevada [in] Petroleum Potential of Wilderness Lands in the western United States edited by Miller, B.M: U. S. Geological Survey Circular 902-A-P.

EXPLANATION

Mineral resources of the Red Spring Wilderness Study Area.

Name: Resting Springs Range
Area number: NV-050-460
Size (acres): 3,850

Status of mineral surveys: This area was not studied by the U.S. Geological Survey or the U.S. Bureau of Mines.

Identified mineral resources (known): No mineral resources have been identified within the Wilderness Study Area. Zeolite (clinoptilolite), borates, strontium, nitrates, lithium, clay, silica, carbonates, pumicite, stone, gold, silver, copper, lead, zinc, uranium, and geothermal energy occur nearby.

Mineral resource potential (undiscovered): Due to the location and occurance of similar rock types as those of the Walker Lane mineral belt, the potential for antimony, coppper, fluorspar, gold-silver, iron, tungsten, and mercury is low. The presence of several hot springs in the area makes the potential for geothermal resources low to moderate, and there is no potential for petroleum. There is a moderate to high potential for the mining of bentonite clay.

Mining activity: Zeolites have been mined at Ash Meadows, a few miles north of the study area.

No mining claim locations were active in the study area in July 1989 (BLM records), nor were there any mines or prospects. There were no oil and gas leases in 1983 (Great Basin GEM Joint Venture, 1983).

Geology: Quartzite, conglomerate, siltstone, limestone and dolomite of Precambrian age are downthrown by two N/NE trending faults which form a small graben structure. The area is located to the south west of the southern end of the Virginia City Tonopah mineral belt (Walker Lane). The northwest portion consists of Tertiary sediments intercalated with minor amounts of volcanic tuff and abundant clays. Cinder cones and some hot springs have been identified in the area. To the east, the Precambrian unit is overlain by Quaternary alluvial deposits of beach sand and dune fields.

Recommendations: This Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

Berridge, W.C., 1982, National Uranium Resource Evaluation, Death Valley Quadrangle, California and Nevada: Grand Junction, Colorado, Bendix Field Engineering Corporation, for U.S. Department of Energy, Open-File report PGJ/F-083(82), 50 p. and appendixes.

Burchfiel, B.C., Hamill, G.S., IV, and Wilhelms, D.E., 1983, Structural geology of the Montgomery Mountains and the northern half of the Nopah and Resting Spring Ranges, Nevada and California: Geological Society of America Bulletin 94, No. 11, p. 1359-1376.

Cook, J.R., 1979, Death Valley 1° x 2° NTMS area, California and Nevada, data report, National Uranium Resource Evaluation Program, hydrogeochemical and stream sediment reconnaissance: Aiken, SC, E.I. du Pont de Nemours & Co, Savannah River Laboratory, for U.S. Department of Energy, Open-File Report GJBX 135(80), 42 p., appendixes A, B, C.

Cook, J.R., and Fay, W.M., 1982, Data report: western United States, National Uranium Resource Evaluation Program, hydrogeochemical and stream sediment reconnaissance: Aiken, SC, E.I. du Pont de Nemours and Company, Savannah River Laboratory, for U.S. Department of Energy, Open-File Report GJBX 132(82), 33 p.

Denny, C.S., and Drewes, H., 1965, Geology of the Ash Meadows Quadrangle, Nevada-California: U.S. Geological Survey Bulletin 1181-l, 56 p.

Geo-Life, Aerial radiometric and magnetic survey, Death Valley National Topographic Map, Nevada, California: Grand Junction, CO, U.S. Department of Energy Open-File Report GJBX-164(79), 39 p. and appendixes.

Great Basin GEM Joint Ventures, 1983, Resting Spring Range G-E-M Resources Area (GRA NO. NV-30) Technical Report (WSA NV 050-0460): Prepared for the U.S. Bureau of Land Management, 28 p.

Miller, M.S., 1985, Mineral resources of the Resting Spring Range Wilderness Study Area (BLM No. CDCA-145), Inyo County, California: U.S. Bureau of Mines Open File Report MLA 6-85, 63 p.

Sheppard, R.A., and Gude, A.J., 3rd, 1968, Distribution and genesis of authigenic silicate minerals in tuffs of Pleistocene Lake Tecopa, Inyo County, California: U.S. Geological Survey Professional Paper 597, 38 p.

Mineral resources of the Resting Springs Range Wilderness Study Area.

Explanation, mineral resources of the Resting Springs Range Wilderness Study Area.

Name: Riordan's Well
Area number: NV-040-166
Size (acres): 57,002 of which 37,542 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Lund and others, 1988).

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area.

Extensive areas of limestone and sand and gravel occur within the WSA but, distance to market combined with the abundance of these commodities in the region prevent these materials from being classified as identified resources.

Mineral resource potential (undiscovered): The Riordan's Well Wilderness Study Area has high resource potential for oil and gas, although specific traps have not been identified. Almost half the area has been leased for oil and gas.

Moderate mineral resource potential is designated for three types of metal occurrence in two parts of the study area. The western part of the study area has moderate potential for tungsten and polymetallic base-metal (copper, lead, zinc, molybdenum, and bismuth) deposits in hydrothermal replacement deposits in low-grade metamorphic rocks and for gold and silver in quartz veins associated with the replacement mineralization. The southeastern and eastern parts of the study area have moderate potential for gold in disseminated deposits associated with jasperoid occurrences.

The remainder of the area has low resource potential for other metals, nonmetals (magnesite, high-purity limestone or dolostone), or other energy resources (geothermal energy, uranium, and coal).

Mining activity: There is no production from the WSA. However, there are 296 claims according to July 1989 BLM records. These include claim blocks by Westmont Mining Incorporated, Inspiration Development Company, Icarus Exploration, Ronald Willden (Permian Exploration Co.), and Phelps Dodge Corporation; probably mostly for gold and silver.

Geology: The Grant Range is an east-tilted fault block. The faulting exposed a stratigraphic section, from west to east, of thick carbonate sedimentary rocks of the paleozoic (see geologic time scale in Appendix) continental shelf that are overalin by Tertiary basin deposits and by a sequence of Tertiary volcanic and basin-fill deposits. The oldest exposed Paleozoic rocks are metamorphosed. Rocks of the Grant Range show a complex structural history developed during Mesozoic compressional and Tertiary extensional events.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 19,460 acres that constitute the balance.

References:

Hamilton, M.M., 1987, Mineral Resources of part of the Riordans Well Wilderness Study Area, Nye County, Nevada: U.S. Bureau of Mines Open File Report MLA 26-87, 22 p.

Kleinhampl, F.J. and Ziony, J.I., 1984, Mineral Resources of Northern Nye County, Nevada: Nevada Bureau of Mines and Geology Bull. 99 B, 243 p.

Lund, K., Beard, L.S., Blank, H.R. Jr., Hofstra, A.H., and Hamilton, M.M., 1988, Mineral Resources of the Riordans Well Wilderness Study Area, Nye County, Nevada: U.S. Geol. Survey Bull. 1731-H, 16 p.

Mineral resources of the Riordan's Well Wilderness Study Area.

Explanation, mineral resources of the Riordan's Well Wilderness Study Area.

Name: Roberts
Area number: NV-060-541
Size (acres): 15,090

Status of mineral surveys: This wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (McKee and others, 1986).

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area. The one known deposit, the Kelley mine, is too small and low grade to be mined in the foreseeable future (Benjamin and Johnson, 1986). The deposit was too poorly known to allow estimation of resources.

Mineral resource potential (undiscovered): Stream-sediment samples from the Kelley Creek drainage contain anomalous amounts of silver, lead, and zinc; the area including this drainage has low mineral resource potential for these metals in hydrothermal veins that follow faults and shear zones in carbonate host rock. Some rock samples from outcrops along the east edge of the study area contain anomalous amounts of gold and silver, as well as a suite of volatile elements including arsenic, antimony, and mercury that locally are indicators of precious-metal mineralization. These samples are associated with silicified zones that formed in dolomitic rock beneath the Roberts Mountains thrust fault. These zones have high, moderate, and low resource potential for gold and silver. Two similar areas of silicified and altered dolomite in the southwest part of the study area have moderate-to-low resource potential for gold and silver. An east-west trending zone in the central part of the study area and two areas near its western edge contain anomalous amounts of gold and silver in altered dolomite and limestone associated with major faults and shear zones. These areas have moderate-to-low potential for gold and silver resources. Because of widespread heating by igneous activity in the area, there is little to no likelihood of oil and gas resources.

Mining activity: The Kelley mine is located in Kelley Canyon, in the northern portion of the study area. In 1937, it produced 47 tons of ore containing 0.8 oz/ton silver, 9.6 percent lead, and 39.8 percent zinc. Prior to this, in the early 1900s, it had produced 350 tons of ore of unknown content. The Kelley mine is within the Antelope mining district, which has produced about $200,000 in lead, silver, copper, and barite.

In the early 1980s, 10,000 tons of barite was mined from the Bat and Bar claims, east of the study area, and several hundred tons was produced from the Firecracker claims, southwest of the study area. Decreased demand for barite has put these properties out of production.

The Blue Eagle mine is on the western flank of the Roberts Mountains, in the Antelope mining district. At the shaft there is a small stockpile of ore which contains 39 percent antimony (Lawrence, 1963).

The Mount Hope mining district, which lies to the southeast of the WSA, has produced more than $1 million worth of zinc and cadmium. The Antelope mining district, which includes the western portion of the WSA, has produced about $200,000 in lead, silver, copper, and barite.

There are large blocks of mining claims, consisting of several thousand claims, in and around the WSA on the west, south, and east. There are about 200 claims within the WSA (BLM records, July 1989).

Geology: The study area is underlain by a folded and faulted sequence of marine sedimentary rocks of Cambrian through Devonian age (about 570 to 360 million years ago) capped in places by Tertiary (about 65 to 2 million years age) lava and ash flows and intruded by many Tertiary basalt dikes. Most of the Cambrian through Devonian rocks int he study area are limestone and dolomite. The Roberts Mountains thrust, and important regional structural feature, is present in the southeast part of the wilderness study area.

Recommendations: No further studies are recommended.

References:

Benjamin, D. A., and Johnson, F. L., 1986, Mineral resources of the Roberts Wilderness Study Area, Eureka County, Nevada: U. S. Bureau of Mines open-file report MLA 24-86, 27 p.

Great Basin GEM Joint Venture, 1983, Robert G-E-M Resources Area (GRA No. NV-08) technical report (WSA NV 060-451): Prepared for the BLM under contract YA-553-RFP2-1054 for the BLM, 33 p.

Higgins, L. R., Earnest, D. F., and Cox, A. D., 1988, Nevada BLM Wilderness Study Areas mineral potential handbook: Nevada Mining Association, Reno, Nevada, 257 p.

Lawrence, E. F., 1963, Antimony deposits of Nevada: Nevada Bureau of Mines and Geology Bulletin 61, 248 p.

McKee, E. H., Barton, H. N., Ponce, D. A., Benjamin, D. A., and Johnson, F. L., 1986, Mineral resources of the Roberts Wilderness Study Area, Eureka County, Nevada: U. S. Geological Survey Bulletin 1731-K, 10 p.

Papke, K. G., 1984, Barite in Nevada: Nevada Bureau of Mines and Geology Bulletin 98, 125 p.

EXPLANATION

Mineral resources of the Roberts Wilderness Study Area.

Name: Rough Hills
Area number: NV-010-151
Size (acres): 6,685

Status of mineral surveys: This wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Wallace and others, 1987).

Identified mineral resources (known): Placer gold has been identified in the study area at the Perry Prospect, near the confluence of Copper Creek and the Bruneau River. The gold occurs in bedrock fractures and sandy gravels overlying the bedrock. Gold value varies from less than $0.10 per cubic yard to more than $9.00 per cubic yard (gold price of $325 per troy ounce). The average gold value is less than $1.00 per cubic yard. About 3,000 cubic yards of gravel occur.

Mineral resource potential (undiscovered): The wilderness study area has a low mineral resource potential for undiscovered metasomatic gold, silver, tungsten, molydbenum, and copper, disseminated gold and silver, placer gold, barite, tin, sand and gravel, uranium and thorium, and oil and gas.

Mining activity: Three mining districts are adjacent to or within five miles of the WSA. The Charleston district is about one mile east of the WSA, the Island Mountain district is about one mile west, and the Alder district is about five miles northwest. These districts have produced gold, silver, copper, lead, zinc, tungsten, and antimony, mostly from veins. Renewed interest in these districts has been spurred by current metal prices.

Geology: Most of the Rough Hills Wilderness Study Area is underlain by the Jarbidge Rhyolite, a volcanic rock that was erupted approximately 15 m.y. ago (million years ago; see geologic time chart in appendix of this report). Mesozoic sedimentary rocks andolder Tertiary volcanic rocks underlie the Jarbidge Rhyolite, and upper Tertiray sedimentary rocks overlie the rhyolite. All of the rocks in the area are faulted to some degree.

Recommendations: No further work is recommended.

References:

Coash, J.R., 1967, Geology of the Mount Velma Quadrangle, Elko County, Nevada: Nevada Bureau of Mines Bulletin 68, 20 p.

Granger, A.E., Bell, M.M., Simmons, G.C., and Lee, Florence, 1957, Geology and mineral resources of Elko County, Nevada: Nevada Bureau of Mines Bulletin 54, 190 p.

Hope, R.A., and Coats, R.R., 1976, Preliminary geologic map of Elko County, Nevada: U.S. Geological Survey Open-File Map OF 76-779, scale 1:100,000, six sheets.

Lawrence, E.F., 1963, Antimony deposits of Nevada: Nevada Bureau of Mines Bulletin 61, 248 p.

Mathews, G.W., and Blackburn, W.H., 1983, Assessment of geology energy and mineral (GEM) resources, Rough Hills GEM Resource Area, (NV-010-03), Elko County, Nevada: Lakewood, Colorado, TERRADATA, U.S. Bureau of Land Management contract YA-553-CT2-1042 Open-File Report, 52 p.

Quade, J., and Tingley, J.V., 1984, Reconnaissance geochemical assessment of mineral resources in Rough Hills WSA (NV-010-151) Elko County, Nevada: Nevada Bureau of Mines and Geology for U.S. Bureau of Land Management contract YA-553-CT1-1058 Open-File Report, 15 p.

Smith, R.M., 1976, Mineral resources of Elko County, Nevada: U.S. Geological Survey Open-File Report 76-56, 194 p.

Wallace, A.R., Turner, R.J., Grauch, V.J.S., and Plesha, J.L., 1987, Mineral resources of the Rough Hills Wilderness Study Area, Elko County, Nevada: U.S. Geological Survey Bulletin 1725-D, 10 p.

Mineral resources of the Rough Hills Wilderness Study Area.

Explanation, mineral resources of the Rough Hills Wilderness Study Area.

Name:	Selenite Mountain
Area number:	NV-020-200
Size (acres):	32,041
Status of mineral surveys:	This area was not studied by the U.S. Bureau of Mines or the U.S. Geological Survey.
Identified mineral resources (known):	No mineral resources have been identified in the Wilderness Study Area.
Mineral resource potential (undiscovered):	Resource potential for epithermal type gold and (or) silver deposits is low in the entire area. There is moderate potential for geothermal energy resources in the extreme northern part of the area and low potential in the rest of the area. No evidence is available that indicates the presence of any resource potential for oil or gas in this area.
Mining activity:	July 1989 BLM records show no active mining claims in the study area. The Hooker mining district, about one mile south of the WSA, has had production of gypsum and tungsten.
Geology:	The area is underlain by metamorphiosed volcanic rocks of Late Permian age that have been intruded by Cretaceous granodiorite. Locally these rocks are capped by younger volcanic and sedimentary rocks.
Recommendations:	Detailed geologic mapping, geochemical sampling, and geophysical studies would identify alteration areas which, if present would raise the potential for precious metal deposits. The Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.
References:	Barringer Resources, Inc., 1982, Geochemical and geostatistical evaluation of wilderness study areas, Winnemucca district, northwest Nevada, 5 v.: Golden, Colo. (available from NTIS, U.S. Department of Commerce, Springfield, VA 22161,or call Information Center and Bookstore (202) 377-0365). Bonham, H.F., 1969, Geology and mineral deposits of Washoe and Story Counties, Nevada, *with a section on* Industrial mineral deposits by K.G. Papke: Nevada Bureau of Mines and Geology Bulletin 70, 140 p. Johnson, M.G., 1977, Geology and mineral deposits of Pershing County, Nevada: Nevada Bureau of Mines and Geology Bulletin 89, 115 p.

Keith, W.J., Turner, R.L., Plouff, Donald, and Rumsey, C.M., 1986, Mineral resources of the Mount Limbo Wilderness Study Area, Pershing County, Nevada: U.S. Geological Survey Bulletin 1726-A, 11 p.

Muffler, L.J.P., ed., Assessment of geothermal resources of the United States-1978: U.S. Geological Survey Circular 790, 163 p.

Sandberg, C.A., 1983, Petroleum potential of wilderness lands in Nevada, *in* Miller, B.M., ed., Petroleum potential of wilderness lands in the western United States: U.S. Geological Circular 902-A-P, p. H1-H11.

EXPLANATION

Mineral resources of the Selenite Mountain Wilderness Study Area.

Name: Sheldon Contiguous

Area number: CA-020-1012

Size (acres): 24,130 of which 780 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Bergquist and others, 1988).

Identified mineral resources (known): There are no identified mineral resources in the wilderness study area.

Mineral resource potential (undiscovered): There is low potential for undiscovered natural gas resources and low potential for mercury, gold, and silver resources beneath the basalt.

Mining activity: There has been no known prospecting activity or mineral production from the wilderness study area. The wilderness study area is not part of any organized mining district; there are no current mining claims in the wilderness study area according to October, 1988, U.S. Bureau of Land Management records.

Geology: The study area is in a transitional region between the Basin and Range and the Columbia Plateau physiographic provinces and is covered by Cenozoic (see appendixes for geologic time chart) volcanic rocks. The surrounding area is broken by sets of predominantly northwest-trending high-angle normal faults that have shaped the terrain into flat-topped, tilted fault blocks bounded by steep fault scarps.The entire study area is underlain by basalt of Miocene age which weathers to a dark-gray or black color and forms a bouldery surface.

Recommendations: As 23,350 acres (96 percent) were not requested for mineral surveys by the U.S. Bureau of Land Management, this unstudied part of the wilderness study area should be studied as part of a comprehensive mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines.

References:

Bergquist, J.R., Plouff, Donald, and Esparza, L.R., 1988, Mineral resources of the Sheldon Contiguous Wilderness Study Area, Washoe County, Nevada: U.S. Geological Survey Open-File Report 88-246, 14 p.

Cathral, J.B., Siems, D.F., Crenshaw, G.L., and Cooley, E.F., 1984, Geochemical evaluation of the mineral and geothermal resources of the Charles Sheldon Wilderness Study Area, Nevada, Oregon: U.S. Geological Survey Bulletin 1538-C, p. 51-87.

Esparza, L.E., 1986, Mineral resources of the Sheldon Contiguous study area, Washoe County, Nevada: U.S. Bureau of Mines Open-File Report MLA 31-86, 9 p.

Greene, R.C., 1984, Geologic appraisal of the Charles Sheldon Wilderness Study Area, Humboldt and Washoe Counties, Nevada, and Lake and Harney Counties, Oregon: U.S. Geological Survey Bulletin 1538-A, p. 13-34.

Plouff, Donald, 1984, Interpretation of aeromagnetic and gravity data, Charles Sheldon Wilderness Study Area, Nevada, and Oregon: U.S. Geological Survey Bulletin 1538-B, p. 35-50.

Tuchek, E.T., Johnson, F.J., and Conyac, D.M., 1984, Economic appraisal of the Charles Sheldon Wilderness Study Area, Nevada, and Oregon: U.S. Geological Survey Bulletin 1538-D, p. 89-139.

Mineral resources of the Sheldon Contiguous Wilderness Study Area.

Name: Silver Peak Range

Area number: NV-060-338

Size (acres): 33,900 of which 17,850 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Keith and others, 1988).

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): Two parts of the study area have high and moderate resource potential and the remainder has low resource potential for gold and silver in epithermal veins. The entire study area has low resource potential for gold and silver in epithermal disseminated deposits and geothermal energy. One small area in Icehouse Canyon has low resource potential for cement-grade marble.

There is low potential for oil and (or) gas resources and also for uranium and thorium resources in the entire study area.

Mining activity: The Silver Peak mining district is on the east side of the study area and the Dyer mining district is on the west. Sunshine Mining Company's Sixteen-to-One mine is located 3 miles to the east. Approximately 2000 active claims are located within or adjacent to the study area. Mineralization within and near the WSA consists mainly of epithermal quartz veins which occur along fractures in volcanic and calcareous sedimentary rocks. Veins contain anomalous amounts of arsenic, lead, zinc, copper, and barium at the surface.

Geology: The predominant rock types in the study area are volcanic flows and pyroclastic rocks of Tertiary age (1.7 to 66 million years before present, or Ma) (see geologic time chart in appendixes) that overlie sedimentary rocks of Paleozoic age and plutonic rocks of Jurassic age. The study area is bordered on the northwest by a broad alkali flat that is part of Fish Lake Valley and on the east by the west margin of the Silver Peak caldera.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 16,050 acres that constitute the balance. Additional mapping and sampling are needed within the area previously studied to further define potential resources.

References:

Albers, P. J., and Stewart, J. H., 1972, Geology and mineral deposits of Esmeralda County, Nevada: Nevada Bureau of Mines and Geology Bulletin 78, 80 p.

Close, T. J., 1986, Mineral resources of the Silver Peak North study area, Esmeralda County, Nevada: U.S. Bureau of Mines Mineral Land Assessment Open-File Report MLA 17-87, 17 p.

Earnest, D. F., 1984, Geology of the Sixteen-to-One mine, Esmeralda Conty, Nevada: an unpublished Sunshine Mining Company report, 6 p.

Keith, W.J., Turner, R.L., Blakely, R.J., Ehmann, W.J., and CLose, T.J., 1988, Mineral resources of the Silver Peak Range Wilderness Study Area, Esmeralda County, Nevada: U.S. Geological Survey Bulletin 1731-G, 20 p.

Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: Reno, Nevada, unnumbered pages.

Robinson, P. T., Stewart, J. H., Moiola, R. J., and Albers, J. P., 1976, Geologic map of the Piper Peak Quadrangle, Esmeralda County, Nevada: U.S. Geological Survey Geologic Quadrangle Map GQ-1325, scale 1:62,500.

Stewart, J. H., Robinson, P. T., Albers, J. P., and Crowder, D. F., 1974, Geologic map of the Piper Peak Quadrangle, Esmeralda County, Nevada: Geologic Quadrangle Map, GQ-1186, scale 1:62,500.

U.S. Bureau of Mines, 1986, Mineral briefing summaries for Nevada Bureau of Land Management proposed wilderness areas: Western Field Operations Center, Spokane, Washington, unnumbered pages.

Mineral resources of the Silver Peak Range Wilderness Study Area.

Explanation, mineral resources of the Silver Peak Range Wilderness Study Area.

Name:	Simpson Park
Area number:	NV-060-428
Size (acres):	49,670
Status of mineral surveys:	This area was not studied by the U.S. Bureau of Mines or the U.S. Geological Survey.
Identified mineral resources (known):	No mineral resources have been identified in the Wilderness Study Area.
Mineral resource potential (undiscovered):	There is low potential for resources of barite in the northern part of the area in the siliceous Ordovician strata. Turquoise might be found in the same type of rocks in the same general area. There is low potential for oil and gas resources.
Mining activity:	The Lombardo Turquoise Mining Co., Inc., is currently mining turquoise and variscite from the Ackerman mine, about 1 mile south of the WSA. Barite is reported to occur in the northern and western portions of the WSA (Papke, 1984; Higgins and others, 1988). There is a large block of about 100 claims in the Shagnasty Basin area, and another block of about 30 claims in the northernmost portion of the WSA (BLM records, July 1989). Oil and gas leases cover 700 acres of the valley and lower mountain slopes of the WSA.
Geology:	The southern two thirds of the area is comprised of Oligocene andesitic volcanic rocks, mostly lava flows that overlie siliceous sedimentary rocks of Ordovician age. The Ordovician strata are part of the upper plate of the late Paleozoic Roberts Mountains thrust system.
Recommendations:	Detailed geochemical sampling of rocks and stream sediments in the northern part of the area checking specifically of Ba, Pb, Zn, Cu, Hg, An, As, and Au. This Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.
References:	Higgins, L. R., Earnest, D. F., and Cox, A. D., 1988, Nevada BLM Wilderness Study Areas mineral potential handbook: Nevada Mining Association, Reno, Nevada, 257 p. McKee, E.H., 1968, Geologic map of the Ackerman Canyon Quadrangle, Lander and Eureka Counties, Nevada: U.S.Geological Survey Quadrangle Map GQ-761, scale 1:62,000. Papke, K. G., 1984, Barite in Nevada: Nevada Bureau of Mines and Geology Bulletin 98, 125 p.

Roberts, R.J., Montgomery, R.M., and Lehner, R.E., 1967, Geology and Mineral Resources of Eureka County, Nevada: Nevada Bureau of Mines Bulletin 64, 152 p.

Stewart, J.H., McKee, E.H., 1977, Geology and mineral deposits of Lander County, Nevada: Nevada Bureau of Mines and Geology Bulletin 88, 106 p.

EXPLANATION

Mineral resources of the Simpson Park Wilderness Study Area.

Name: Skedaddle
Area number: CA-020-612
Size (acres): 60,960 of which 39,420 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Diggles and others, 1988b).

Identified mineral resources (known): The identified resources in the Skedaddle Mountain Wilderness Study Area consist of 46,000 tons of measured subeconomic resources and about 138,000 tons of indicated subeconomic resources of perlite. Additional nonmetallic occurrences present in the study area consist of basalt, pozzolan, stone, and sand and gravel. There are no identified resources of these commodities and they are not currently of economic significance. There are no identified resources of metallic minerals in the study area, but metallic mineral occurrences present in and near the study area consist of small amounts of gold and mercury in vein-type deposits. The gold and mercury occurrences and the perlite resources are spatially related to a volcanic center in the Skedaddle Mountains.

Mineral resource potential (undiscovered): There are six areas of mineral and (or) geothermal energy resource potential in the Skedaddle Mountain Wilderness Study Area. Geologic and geochemical evidence suggests that the study area has potential for the occurrence of silver, gold, mercury, and antimony metallic deposits. The central part of Spencer Basin, upper Thousand Springs Canyon, and the south fork of Wendel Canyon have high mineral resource potential for gold, silver, mercury, and antimony while the area surrounding these locations has moderate mineral resource potential for the same metals. An area in Wendel Canyon has moderate mineral resource potential for perlite, and an adjacent area to the south has low mineral resource potential for the same commodity. The Skedaddle Mountain Wilderness Study Area includes part of the Wendel-Amedee Known Geothermal Resource Area. The southwest corner of the study area has moderate resource potential for geothermal energy and much of the west half of the study area has low potential for geothermal energy.

Mining activity: The wilderness study area is not in a mining district. There are no current mining claims in the wilderness study area according to October, 1988, U.S. Bureau of Land Management records. By 1906, 45 lode claims were recorded for gold including a few for mercury. None of the prospects or claims in or within 1 mi of the study area have recorded production. At least 276 recorded lode, 6 located but unrecorded lode, and 29 placer claim locations are present in and within about 1 mi of the study area. Approximately 191 of these are in the study area; four of these were actively held in 1985. None of the study area was being explored by private industry in 1985, but prospects in the Skedaddle Mountains may be targets for future exploration for both precious metals and perlite.

Geology: The rocks in the study area consist mostly of Tertiary basalt, andesite, dacite, and lahar deposits; minor amounts of rhyolite are also present. Surficial deposits consist of colluvium, alluvium, talus, and lacustrine deposits. South of the study area are lakebed features including tufa deposits and strandlines from Pleistocene Lake Lahontan. Andesite flows, commonly including intercalated basalt, are exposed mostly at higher elevations in the study area. Olivine basalt flows, exposed in the eastern part of the area, are composed of fine-grained to glassy matrix and phenocrysts of olivine. Thick lahar deposits are exposed in the western and southern parts of the study area. Lahars are volcanic debris flows containing at least 80 weight percent solids. They consist of volcanic mud-flow breccia occurring as flows filling channels and as crusts on sides of channels. Two dacite flow-dome complexes crop out along and north of the crest of the Skedaddle Mountains. Dacite flows are also present in Thousand Spring Canyon.

The central part of Spencer Basin is underlain by volcanic rocks which probably were andesite, dacite, and lahar deposits, but which have been silicified, propylitized, and potassically altered to an extent that original lithologies were unrecognizable. Gold mineralization may have been extensive in these altered rocks.

Recommendations: As only 43 percent of the Skedaddle Mountain Wilderness Study Area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the remaining 21,540 acres. The area also contains three areas which particularly warrant further study; all are in or along the boundary of the study area.

- Perlite is present in a group of rhyolite and rhyolitic units in Wendel Canyon. The perlite occurrence and surrounding area need to be investigated in greater detail in order to determine tonnage and grade with certainty and to look for extensions.

- Near the headwaters of the south fork of Wendel Canyon an area of about 1 mi^2 contains pervasive argillic alteration, bleaching, extensive limonite staining, quartz veins and veinlets, felsic dikes, some sulfides, geochemical anomalies, and minor amounts of gold. These characteristics are typical of some bulk-tonnage, low-grade, gold and silver deposits. This area should be examined in greater detail for precious metals, especially gold, in either vein (at depth) or bulk-tonnage deposits. Work should include detailed geologic mapping, sampling, induced polarization (IP), magnetometer, and EM16 geophysical surveys, followed by drilling if appropriate.

- A 2 mi-long area of siliceous-sinter outcrops is present near the head of Thousand Spring Canyon, and along the south edge of Spencer Basin. This area contains extensive sinter which has been bleached, contains limonite, and has locally anomalous trace-element concentrations. Additional work is needed to determine the significance, extent, and character of this occurrence as a possible indicator of disseminated gold and silver deposits. Detailed work should include geologic mapping, sampling, geophysical studies (IP, resistivity, EM16, and magnetometer) followed by drilling if appropriate.

References:

California State Mineral Information Service, 1959, Geology of northeastern California: California State Department of Natural Resources, Division of Mines, Mineral Information Service v. 12, no. 6, p. 1-7.

Chesterman, C.W., 1966, Pumice, pumicite, perlite, and volcanic cinders, *in* Albers, J.P., ed., Mineral and water resources of California: California Division of Mines and Geology Bulletin 191, p. 336-341.

Diggles, M.F., Batatian, L.D., and Dellinger, D.A., 1986, Geologic map of the Dry Valley Rim Wilderness Study Area, Lassen County, California and Washoe County, Nevada: U.S. Geological Survey Open-File Report 86-83, scale, 1:48,000.

Diggles, M.F., Dellinger, D.A., and Batatian, L.D., 1989, Geologic map of the Skedaddle Mountain Wilderness Study Area, Lassen County, California, and Washoe County, Nevada: U.S. Geological Survey Miscellaneous Field Studies Map MF-2006, scale 1:48,000.

Diggles, M.F., Frisken, J.G., Plouff, Donald, and Linne, J.M., 1988a, Mineral resources of the Dry Valley Rim Wilderness Study Area, Washoe County, Nevada, and Lassen County, California: U.S. Geological Survey Bulletin 1706-D, 17 p.

Diggles, M.F., Frisken, J.G., Plouff, Donald, Munts, S.R., and Peters, T.J., 1988b, Mineral resources of the Skedaddle Mountain Wilderness Study Area, Lassen County, California, and Washoe County, Nevada: U.S. Geological Survey Bulletin 1706-C, 27 p.

Duffield, W.A., and McKee, E.H., 1986, Geochronology, structure, and basin-range tectonism of the Warner Range, northeastern California: Geologic Society of America Bulletin, v. 97, p. 142-146.

Gay, T.E., Jr., 1966, Economic mineral deposits of the Cascade Range, Modoc Plateau, and Great Basin region of northeastern California, in Division of Mines and Geology Bulletin 190, p. 97-104.

Kadey, F.L., Jr., 1983, Perlite, *in* Lefond, S.J., editor-in-chief, Industrial minerals and rocks, 5th ed.: New York, American Institute of Mining, Metallurgical, and Petroleum Engineers, Inc., p. 997-1015.

Linne, J.M., 1987, Mineral resources of the Dry Valley Rim study area, Washoe County, Nevada and Lassen County, California: U.S. Bureau of Mines Open-File Report MLA 18-87, 18 p.

MacDonald, G.A., 1966, Geology of the Cascade Range and Modoc Plateau: in, Bailey, E.H., ed., Geology of northern California: California Division of Mines and Geology Bulletin no. 190, p. 65-96.

MacDonald, G.A., and Gay, T.E., Jr., 1966, Geology of the southern Cascade Range, Modoc Plateau, and Great Basin areas in northeastern California, *in* Albers, J.P., ed., Mineral resources of California: California Division of Mines and Geology Bulletin 191, p. 43-48.

Meisinger, A.C., 1985, Perlite, *preprint from* U.S. Bureau of Mines, Mineral facts and problems: U.S. Bureau of Mines, Bulletin 675, 7 p.

_____1986, Perlite, *in*, U.S. Bureau of Mines: Mineral commodity summaries, p. 114-115.

Munts, S.R., and Peters, T.J., 1987, Mineral resources of the Skedaddle study area, Lassen County, California and Washoe County, Nevada: U.S. Bureau of Mines Open-File Report MLA 22-87, 52 p.

Mineral resources of the Skedaddle Wilderness Study Area.

Explanation, mineral resources of the Skedaddle Wilderness Study Area.

Name: Slinkard
Area number: NV-030-531/CA-010-105
Size (acres): 6,350

Status of mineral surveys: This area was not studied by the U.S. Bureau of Mines or the U.S. Geological Survey.

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): The study area has low resource potential for uranium in the basal gravels of the Relief Peak Formation. The area also has low geothermal resource potential for low temperature geothermal systems along the fault-bounded western edge.

Mining activity: The Silver Mountain mining district is about 10 miles west of the study area and is credited with production of about $300,000.

The Monitor-Mogul mining district, about five miles northwest, has had about $3,000,000 worth of production, mostly of gold and silver. Nearby, the Leviathan mine produced $14.5 million worth of sulfur between 1951 and 1962. The sulfur was used for sulfuric-acid leaching at the Yerrington copper mine in Nevada.

Three miles south of the study area is the Silver King mining district, which has two gold-silver mines but unknown production.

July 1989 BLM records show 200 claims active in the WSA. Large, altered rhyolite and andesite flows have been described in the study area and nearby. Many mining claims have been staked on these altered areas.

Geology: The area is underlain by a layer of interbedded andesitic and basaltic lava flows and mudflows of the Tertiary-age Relief Peak Formation overlying a granitic pluton of Cretaceous age. The western edge of the area is fault bounded.

Recommendations: Since uranium is known to exist in the basal portion of the Relief Peak Formation, detailed mapping in the unit would indicate weather or not this part of the formation is present and thus clarify the uranium resource potential. Detailed mapping would also locate areas of hydrothermal alteration existing at the surface. This work should be supported by a geochemical study of the area as well. With consideration that three mining districts within 10 mi of the wilderness study area in similar rock types, a mapped intrusive into sedimentary rocks in the area, and the number of mining claims, the wilderness study area should be studied as part of a comprehensive mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines.

References:

Clark, W.B., 1970, Gold districts of California: California Division of Mines and Geology Bulletin 193, 186 p.

Clark, W.B., 1977, Mines and mineral resources of Alpine County, California, with sections on the Zaca gold-silver mine and the Leviathan sulfur mine by James R. Evans: California Division of Mines and Geology, County Report 8, 48 p.

Great Basin GEM Joint Venture, 1983, Slinkard G-E-M resource area (GRA No. CA-01) technical report (WSA's CA 010-105 and NV 030-531): Reno, Nevada, Great Basin GEM Joint Venture for U.S. Bureau of Land Management contract YA-553-RFP2-1054 Open-File Report, 42 p.

Jenkins, O.P., 1950, Copper in California: California Division of Mines and Geology Bulletin 144, 429 p.

Keith, W.J., Chaffee, M.A., Plouff, Donald, and Miller, M.S., 1983, Mineral resource potential of the Carson-Iceberg Roadless areas, central Sierra Nevada, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1416-B, scale 1:62,500.

Koenig, J.B., 1963, Walker Lake Sheet, geologic map of California: California Division of Mines and Geology, scale 1:250,000.

Rapp, J.S., 1981, Uranium mineralization of the Sonora Pass region, Tuolumne County, California: California Geology, March 1981, p. 43-52.

Sampson, R.J., 1940, Mineral resources of Mono County, California: California Division of Mines, California Journal of Mines and Geology, v. 36, no. 2, 42 p.

U.S. Bureau of Mines, 1965, Mercury potential of the United States: U.S. Bureau of Mines Information Circular 8252, 376 p.

_____1989, Mineral Industry Location System (MILS).

EXPLANATION

L/B Geologic terrane having low mineral resource potential for uranium and geothermal energy with certainty level B

Mineral resources of the Slinkard Wilderness Study Area.

Name: South Egan Range
Area number: NV-040-168
Size (acres): 96,916

Status of mineral surveys: This area was not studied by the U.S. Bureau of Mines or the U.S. Geological Survey.

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): The rocks and geologic setting of the Egan Range proposed wilderness area are similar to the rocks and geologic setting of the adjacent Far South Egans and nearby Mount Grafton Wilderness Areas. It is reasonable to infer that the resource potential and commodities are likely to be similar as well. Areas in the adjacent Far South Egans Wilderness Area (040-172) have identified resources of perlite and high-silica quartzite. Areas likely to have moderate resource potential for gold, cadmium, molybdenum, lead, and zinc have also been identified. East across Cave Valley, areas in the Mount Grafton Wilderness Area (040-169) have identified resources of zinc in low grade deposits, and areas with a high resource potential for tungsten and copper. The Mount Grafton Wilderness Area also contains areas that have a high resource potential for tungsten, zinc, and copper and a moderate resource potential for tungsten, zinc, silver, gold and fluorite.

Both potential source and reservoir.rocks for petroleum are present.

Mining activity: The Ellison/Sawmill Canyon mining district lies along the northern boundary of the WSA. Mining occurred in the 1930's and 1940's; the district has produced 3 troy ounces of gold, 801 troy ounces of silver, 11,427 pounds of copper, 4,325 pounds of lead, and 1,910 pounds of zinc. Copper mineralization in skarn near Sawmill Canyon and gold and silver occurrences along the northwest side of the WSA have been reported (Tingley and Bentz, 1983).

The Geyser Ranch mining district, about 10 miles east-southeast of the WSA, is credited with production of 47 tons of 0.35 percent WO3 (tungsten trioxide). Additional tungsten, and silver and base metals, about $100,000 worth, have been produced from the Patterson mining district, about 15 miles southeast of the study area.

July 1989 BLM records show 67 claims active in the WSA. Most of the claims are along the northern and northwestern boundaries.

Geology: The area is part of a steep sided, fault-bounded mountain range typical of the Basin and Range province. A thick sequence of Paleozoic limestone, dolomite, shale, siltstone, sandstone, and quartzite is unconformably overlain by Tertiary volcanic and tuffaceous sedimentary rocks. Some Tertiary volcanic rocks may intrude Paleozoic rocks.

Recommendations: Because significant mineral resources and resource potential have been identified in the closest nearby wilderness areas, this area should be studied as part of a comprehensive mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines.

References

Great Basin GEM Joint Venture, 1983, Egan/Mount Grafton G-E-M resources area (GRA No. NV-14) technical report (WSA's NV 040-168, 040-169, and 040-172):Reno, Nevada, Great Basin GEM Joint Venture for U.S. Bureau of Land Management contract YA-554-RFP2-1054 Open-File Report, 47 p.

Hedlund, D.C., Davies, R.C., Hovorka, D.S., Blank, H.R., Jr., and Tuftin, S.E., 1987, Mineral Resources of the Far South Egans Wilderness Study Area, Lincoln and Nye Counties, Nevada, Chapter C: U.S. Geological Survey Bulletin 1728-C, 11 p.

Hill, J.M., 1916, Notes on some mining districts in eastern Nevada: U.S. Geological Survey Bulletin 648, 214 p.

Hose, R.K., Blake, M.C., Jr., and Smith, R.M., 1976, Geology and mineral resources of White Pine County, Nevada: Nevada Bureau of Mines and Geology Bulletin 85, parts I and II, 105 p.

Kleinhampl, F.J., and Ziony, J.I., 1984, Mineral resources of northern Nye County, Nevada: Nevada Bureau of Mines and Geology Bulletin 99B, 243 p.

Kleinhampl, F.J., and Ziony, J.I., 1985, Geology of northern Nye County, Nevada: Nevada Bureau of Mines and Geology Bulletin 99A, 172 p.

Papke, K.G., 1979, Fluorspar in Nevada: Nevada Bureau of Mines and Geology Bulletin 93, 77 p.

Schrader, F.C., 1931, Notes on ore deposits at Cave Valley, Patterson district, Lincoln County, Nevada: Nevada University Bulletin, v. 25, no. 3, Nevada Bureau of Mines Bulletin 10, 16 p.

Tingley, J.V., and Bentz, J.L., 1983, A mineral inventory of the Egan district resource area, Ely district, Nevada: Nevada Bureau of Mines and Geology Open-File Report 83-1, 27 p.

Tschanz, C.M., and Pampeyan, E.H., 1970, Geology and mineral deposits of Lincoln County, Nevada: Nevada Bureau of Mines and geology Bulletin 73, 187 p.

Van Loenen, R.E., Blank, H.R., Jr., Barton, Harlan, and Chatman, M.L., 1987, Mineral resources of the Mount Grafton Wilderness Study Area, Lincoln and White Pine Counties, Nevada, Chapter F: U.S,. Geological Survey Bulletin 1728-F, 24 p.

EXPLANATION

Mineral resources of the South Egan Range Wilderness Study Area.

Name: South Fork Owyhee River (Devil's Corrall)
Area number: NV-010-103A/ID-016-053
Size (acres): 7,842 of which 5,180 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Foord and others, 1987).

Identified mineral resources (known): Mineral resources include semi-precious gem stones (chalcedony, thunder eggs, and opal), placer gold, sand and gravel, and stone. Both placer gold deposits are small. Sand and gravel occurrences in the area are suitable for aggregate uses but cannot compete with larger deposits closer to potential markets. Stone resources may contain tens of thousands of tons of material but, lack unique properties that would make them preferable to stone deposits more accessible to potential users. Two diatomite deposits and a zeolite deposit occur within five miles of the WSA in geologically similar environments.

Mineral resource potential (undiscovered): The South Fork Owyhee River Wilderness Study Area has low potential for metals and nonmetals, oil, gas, coal, and geothermal energy.

Mining activity: No mineral production is known from the Wilderness Study Area, although field evidence indicates production of semi-precious gem stones of less than $500 value. Even though the area has been prospected for over 50 years, no mining districts and only five prospects occur in or near the WSA. This area was visited by at least 10 exploration companies in 1989 doing reconnaissance exploration for disseminated gold deposits.

July 1989 BLM records show only one claim currently active in the WSA. Oil and gas lease applications cover large portions of the study region, but no resources have been identified (Foord and others, 1987).

Geology: The South Fork Owyhee River Wilderness Study Area is located on the Owyhee Upland, and extensive volcanic plateau capped by basaltic lava flows that were erupted intermittently between about 10 and 6 million years ago. These basalts lie on 14 million year old rhyolitic tuff that outcrops in several small areas in the bottom of Owyhee Canyon.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 2,662 acres that constitute the balance. Additional detailed investigations are necessary to determine the source of placer gold, the possible presence of disseminated gold deposits, and if zeolite and diatomite bearing beds exist within the WSA.

References:

Berry, M.R., Castor, S.B., and Robins, J.W., 1982, National Uranium Resource Evaluation, Jordan Valley Quadrangle, Oregon and Idaho: United States Department of Energy, Open-File Report PGJ/F-132(82), 33 p.

Ekren, E. B., McIntyre, D. H., Bennett, E. H., and Malde, H. E., 1981, Geologic map of Owyhee County, Idaho, west of longitude 116 degrees west: U.S. Geological Survey Miscellaneous Investigations Map I-1256, scale 1:125,000, 2 sheets.

Foord, E. E., Luessen, M. J., Hovorka, D. S., Plesha, J. L., Grauch, V. J. S., Barton, Harlan, King, H. D., Capstick, D. O., Mayerle, R. T., Buehler, A.R., and Gabby P. N., 1987, Mineral resources of the Owyhee Canyon and South Fork Owyhee River Wilderness Study Areas, Elko County, Nevada, and Owyhee County, Idaho: U.S. Geological Survey Bulletin 1719-F, 20 p.

Geodata International, Inc., 1980, Aerial radiometric and magnetic survey, Jordan Valley national topographic map, Oregon and Idaho; United States Departmentof Energy, Open-File Report GJBX-95(80), 203 p., 108 fiche.

Hope, R. A., and Coates, R. R., 1976, Preliminary geologic map of Elko county, Nevada: U.S. Geological Survey Open-File Report 76-779, scaale 1:100,000,6 sheets.

Mathews, G. W., and Blackburn, W. H., 1983, Assessment of Geology, energy, and mineral (GEM) resosources, Woyhee River GEM Resources Area, (ID-010-11),Owyhee county, Idaho: U.S. Bureau of Land Management contract YA-553-CT2-1042, TERRADATA, Lakewood, CO., 37 p.

Mayerle, R. T., and Gabby, P. N., 1986, Mineral resources of the South Fork Owyhee River Study Areas, Owyhee County, Idaho, and Elko County, Nevada: U.S. Bureau of Mines Open File Report MLA 5-86, 15 p.

Oak Ridge Gaseous Diffusion Plant, 1982, Hydrogeochemical and stream sediment reconnaissance basic data for Jordan Valley quadrangle, Oregon and Idaho;United States Department of Energy, Open-File Report GJBX-58(82), 97 p.,1 fiche.

Weissenborn, A.E. (Ed.), 1964, Mineral and water resources of Idaho; 88 thcongress, 2nd Session, Committee on Interior and Insular Affairs, UnitedStates Senate, 335 p.

EXPLANATION

Mineral resources of the South Fork Owyhee River Wilderness Study Area.

Name: South Jackson Mountains
Area number: NV-020-603
Size (acres): 60,211 of which 10,300 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Sorenson and others, 1987).

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): The results of geologic, geochemical, geophysical, and mineal surveys conducted in 1984 and 1985 delineate one area in the northeastern part of the study area with a moderate potential for undiscovered iron resources in metavolcanic rocks and two areas, in the southeast and northeast corners of the study area, with moderate potential for undiscovered gold, silver, copper, lead, or zinc in metavolcanic rocks. The potential for undiscovered oil and gas geothermal resources is low.

Mining activity: The Red Butte mining district is located on the western slope of the Jackson Mountains, about 25 miles northeast of Jungo, Nevada, and includes the southern portion of the South Jackson Mountains. The area has been prospected for gold, but the only production recorded has been about three carloads of copper-lead ore, one carload of lead-zinc-silver ore, and about twenty tons of antimony ore, mostly during World War I (Vanderburg, 1940). The Claudia mine, on the southern boundary of the study area, produced a total of 25.8 oz gold, 144 oz silver, 262 lb copper, and 943 lb lead in 1919 and 1947. The Prodigal mine, within the southern portion of the study area, produced 1.43 of oz gold, 213 oz of silver, and 648 lb of copper in 1923. The Snowdrift mine is located one-half mile south of the South Jackson Mountains WSA. It produced small amounts of antimony just before and just after World War I, amounting to about 1,200 lbs (Lawrence, 1963).

The Jackson Creek mining district includes the northern part of the study area, and has a total production of about 1,000 tons of copper ore (Sorenson and others, 1987). The Jackson Queen and Humboldt King properties, both within the study area, have been explored since the early 1900s but the only production has been a little copper ore from the Humboldt King. The Harrison Grove (New Northern Light) mine, about 1 mi north of the WSA, was patented in 1907. No information is available on production (Hamilton, 1987).

The Red Boy mine, just outside of the study area produced a total of 1 oz gold, 748 oz silver, 49 lb copper, 5,073 lb lead, and 12,446 lb of zinc in two years of operation, 1940 and 1948 (Sorenson and others, 1987).

There is a block of claims of about 150 claims held by Amax Gold in the east central and northeastern portions of the WSA. Another block of about 50 claims in the northern portion of the study area is held by Wescord Resources. There are about 200 other claims in smaller blocks in the area, many around King Lear Peak and Bliss Canyon (BLM records, July 1989). Oil and gas leases cover 5,332 acres in the WSA.

Geology: The study area is underalin mostly by marine sedimentary and volcanic rocks that have been complexly folded and faulted and intruded by dikes, sills, and small plugs.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 49,911 acres that constitute the balance.

References:

Hamilton, M. M., 1987, Mineral resources of the South Jackson Mountains Wilderness Study Area, Humboldt, County, Nevada: U.S. Bureau of Mines open-file report MLA 10-87, 93 p.

Higgins, L. R., Earnest, D. F., and Cox, A. D., 1988, Nevada BLM Wilderness Study Areas mineral potential handbook: Nevada Mining Association, Reno, Nevada, 257 p.

Lawrence, E. F., 1963, Antimony deposits of Nevada: Nevada Bureau of Mines and Geology Bulletin 61, 248 p.

Sorenson, M. L., Plouff, Donald, Turner, R. L., and Hamilton, M. M., 1987, Mineral Resources of the South Jackson Mountains Wilderness Study Area, Humboldt County, Nevada: U. S. Geological Survey Bulletin 1726-B, 14 p.

Vanderburg, W. O., 1940, Reconnaissance of mining districts in Churchill County, Nev.: U. S. Bureau of Mines Information Circular 7093, 57 p.

Mineral resources of the South Jackson Mountains Wilderness Study Area.

Explanation, mineral resources of the South Jackson Mountains Wilderness Study Area.

Name:	South McCullough Mountains
Area number:	NV-050-435
Size (acres):	56,623 of which 19,558 were studied at the request of the U.S. Bureau of Land Management.
Status of mineral surveys:	Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (DeWitt and others, 1989).
Identified mineral resources (known):	No mineral resources have been identified within the Wilderness Study Area.
Mineral resource potential (undiscovered):	Five areas that make up 20 percent of the study areas have a moderate potential either for undiscovered silver, gold, lead, copper, and zinc resources in small vein deposits, for lanthanum and other rare-earth elements, uranium, thorium, and niobium in medium-size carbonate bodies and dikes, for tungsten and copper in small to medium-size vein deposits, or for silver and gold in small vein or breccia-pipe deposits. Six areas that make up 24 percent of the study area have an unknown resource potential either for gold, silver, lead, and copper in small vein deposits, for gold, silver, lead, zinc, copper, and arsenic in small vein deposits or small to medium-size breccia-pipe deposits, for lanthanum and other rare-earth elements, uranium, thorium, and niobium in medium sized carbonate bodies and dikes, or for tungsten and copper in small vein deposits. The designation of unknown resource potential for these areas is used because available geochemical data are not adequate to assign low, moderate, or high levels of resource potential, Four areas that make up 7 percent of the study area have a low resource potential either for tin, for tungsten and copper, or for copper, gold, silver, and arsenic in small vein deposits. The remaining 30 percent of the study area (areas covered by relatively young volcanic rocks are omitted) has a low resource potential for zinc, copper, silver, and gold, in medium-size to small stratabound deposits, or for niobium, tantalum, uranium, rare earth elements, and thorium in small pegmatite bodies, and an unknown potential for gold and silver in small to medium-size breccia pipes. The entire study area has no resource potential for oil and gas and coal, as well as a low resource potential for oil and gas and coal, as well as low resource potential for these nonmetallic commodities: dimension stone; sand and gravel; pegmatite minerals such as feldspar and mica; and geothermal resources.
Mining activity:	There are no known active mines within the WSA. The McCullough Mining district is located along the western boundary of the WSA. Prospecting and exploration work in this area began as early as 1911 but there is no recorded production.

July 1989 BLM records show approximately 210 active and 20 inactive claims within or adjacent to the WSA.

The geologic history of the study area began in Early Proterozoic time with the accumulation of large amounts of siltstone and sandstone and minor amounts of basalt.. During Middle Proterozoic time many mountain ranges in the area were intruded by granitic to syenitic stocks.

Geology: The Proterozoic rocks remained relatively undisturbed until early Paleozoic time, when they were covered by a sequence of limestone, sandstone, and shale that ranges in age from about 550 to about 50 Ma (Cambrian to Jurassic). Those Paleozoic to Mesozoic units have since been eroded from the McCullough Range, but are present in ranges to the west and north.

In Tertiary time, volcanic and volcaniclastic rocks covered the range. These rocks were faulted and eroded from much of the range. Erosion since middle Tertiary time has created deposits of sand and silt that flank the range.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 37,065 acres that constitute the balance. Rocks similar to those in this study area have yielded important mineral deposits elsewhere in Nevada and Arizona. Detailed geologic and geochemical studies of this area are needed to determine whether similar deposits are present here.

References:

Close, T. J., 1987, Mineral Resources of the South McCullough Mountains Study Area, Clark County, Nevada: U.S. Bureau of Mines Open File Report MLA 11-87, 22 p.

DeWitt, Ed, Anderson, J. L., Barton, H. N., Jachens, R. C., Podwysocki, M. H., Brickey, D. W., and Close, T. J., 1989, Mineral resources of the South McCullough Mountains Wilderness Study Area, Clark County, Nevada: U.S. Geological Survey Bulletin 1730-C, 24 p.

Longwell, C.R., Pampeyan, E.H., Bowyer, Ben, and Roberts, R.J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines and Geology Bulletin 62, 218 p.

Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: unpublished report.

Sandberg, C.A., 1983, Petroleum potential of wilderness lands in Nevada: U.S. Geological Survey Circular 902-H, p. H1-H11.

Mineral resources of the South McCullough Mountains Wilderness Study Area.

Explanation, mineral resources of the South McCullough Mountains Wilderness Study Area.

Name: South Pahroc Range
Area number: NV-050-132
Size (acres): 28,600

Status of mineral surveys: This wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Moring and others, 1988).

Identified mineral resources (known): The South Pahroc Range study area has an indicated perlite resource of about 6 million tons. Samples were tested having expanded densities ranging from 1.63 to 4.56 lb/ft3 which is considered exceptional. Apache tears, prized by rock collectors, are abundant in the northeast corner of the area. They weather out of the perlite and litter the slopes below the outcrop.

Mineral resource potential (undiscovered): Geochemical analyses of jasperoid samples revealed that one part of the study area contains anomalous concentrations of gold, arsenic, and antimony and has a moderate mineral resource potential for disseminated gold. There is a low resource potential for oil and gas and no potential for geothermal energy resources in the study area.

Mining activity: The Mackie Mine has been producing for 30 years averaging 300 tons/year of perlite. No production is recorded for the Kopenite Perlite Mine.

There are five placer claims, probably for perlite, in the WSA according to July 1989 BLM records.

Geology: More than 95 percent of the study area consists of volcanic and sedimentary rocks of Tertiary age (see appendix for geologic time chart). The remainder is Paleozoic quartzite and carbonate rock and Quaternary alluvium.

Recommendations: No further work is recommended.

References:

Callaghan, E., 1937, Geology of the Delamar District, Lincoln County, Nevada: Nevada University Bull., V. 31, No. 5, 72 p.

Moring, B.C., Blank, H.R., Jr., Barton, H.N., and Neumann, T.R., 1988, Mineral Resources of the South Pahroc Range Wilderness Study Area, Lincoln County Nevada: U.S. Geol. Survey Bull. 1729-A, 12 p.

Neumann, T.R., 1986, Mineral Resources of the South Pahroc Range Wilderness Study Area, Lincoln County, Nevada: U.S. Bureau of Mines Open File Report MLA 56-86, 21 p.

Tshanz, C.M., and Pampeyan, E.H., 1970, Geology and Mineral Deposits of Lincoln County, Nevada: Nevada Bureau of Mines and Geology Bull. 73, 188 p.

EXPLANATION

Mineral resources of the South Pahroc Range Wilderness Study Area.

Name: South Pequop

Area number: NV-010-035

Size (acres): 41,090 of which 34,544 acres were studied at the request of the U.S. Bureau of land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Ketner and others, 1987).

Identified mineral resources (known): A subeconomic resource of 250,000 tons of near-surface phosphatic rock at a grade of 16.4 percent P_2O_5 is present. Significantly larger tonnages of low grade material are present. Limestone suitable for agricultural uses (greater than 85 percent $CaCO_3$), and sand and gravel are available closer to market areas.

Mineral resource potential (undiscovered): The geologic formations are mainly limestone and dolomite units, but one heterogeneous sequence, the Plympton Formation, includes beds of chert, shale, and phosphatic rocks. The area occupied by this formation is regarded as having a moderate mineral resource potential (likelihood of occurrence of undiscovered concentrations) for phosphate deposits. However, such deposits, if they exist, are not likely to be very large. In two areas within the study area, geochemical data suggest the possibility of concealed deposits of gold, silver, lead, zinc, and copper. The areas are regarded as having a moderate resource potential for these metals, but there is no indication of the grade or dimensions of these hypothetical deposits. Thermal history and structural conditions in the wilderness study area do not favor the formation and accumulation of oil and gas, and the study area is therefore regarded as having low energy resource potential for these commodities. Common limestone and dolomite underlie almost the entire area of the wilderness study area, but they are of poor quality for all uses except as road material. The resource potential of the study area for thick beds of high-purity limestone and dolomite is low. Common sand and gravel deposits are plentiful in the study area, but they are in now way unique, and no local demand is likely to materialize that cannot be supplied by deposits outside the study area. The study area has a low resource potential for specialty sand and gravel.

Mining activity: No current mining claims are on record with the BLM; however, there are three small prospect pits within the northwestern corner of the WSA and one 150-ft-long trench on phosphate within the southwestern corner of the WSA. There is no recorded production from the WSA; the nearest mining district is the Spruce Mountain district, 3-10 mi to the southwest of the area.

Geology: Geologic terrane in the wilderness study area is one principally of folded limestone and dolomite beds that form north-south-trending ledges and ridges. Among these predominantly carbonate beds is a stratigraphic unit known as the Plympton Formation, a heterogeneous sequence that includes chert, silty beds, shale, and phosphate beds. This formation is of interest because of its content of phosphorus, an essential ingredient of fertilizer. A small granitic intrusive stock is present in the central part of the area.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 6,546 acres that constitute the balance. Extensive surface and subsurface sampling are required to further evaluate the exact character of the phosphatic beds in the Plympton formation and the possible presence of precious-and-base-metal deposits along the northern WSA boundary.

References:

Great Basin G-E-M Joint Venture, 1983, South Pequop G-E-M technical report: Prepared for the Bureau of Land Management under Contract No. YA-554-RFP2-1054, 26 p.

Ketner, K.B., Gerlitz, C.N., Saltus, R.W., and Wood R.H., II, 1987, Mineral resources of the South Pequop Wilderness Study Area, Elko County, Nevada: U.S. Geological Survey Bulletin 1725-B, 16 p.

Wood, R.H., II, 1985, Mineral Investigation of the South Pequop wilderness study area, Elko County, Nevada: U.S. Bureau of Mines Open-File Report MLA 35-85, 23 p.

EXPLANATION

Mineral resources of the South Pequop Wilderness Study Area.

Name: South Reveille
Area number: NV-060-112
Size (acres): 106,200 of which 33,000 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Diggles and others, 1986).

Identified mineral resources (known): No mineral resources have been identified in the wilderness study area.

A 3-ft wide silver- and gold-bearing quartz vein is exposed at a shaft within 500 ft of the southern WSA boundary. A 2 mi^2 area at the southern tip of the WSA is altered, fractured, contains anomalous arsenic concentrations and may host a large tonnage, low grade gold deposit.

Mineral resource potential (undiscovered): Field work and geochemical sampling revealed one mineralized area that lies astride the southern boundary of the study area. Most of the mineralized areas has low mineral resource potential for gold and silver in vein deposits, except for the central core, which has moderate resource potential for the same metals.

Mining activity: Mining activity within the WSA has been limited to claim staking at the northern extreme of the WSA near the periphery of the Reveille mining district. The Reveille mining district is about 2 mi northwest of the WSA and produced about 8,200 tons of silver and lead ore worth about $600,000 prior to 1920. The sedimentary rocks which host the ore deposits of the Reveille district are not exposed in the WSA. Depth to the sedimentary rocks, if they are present, is unknown.

Geology: The Reveille Range, a north-northwest-trending uplifted fault block within the Basin and Range physiographic province, is bounded by the Reveille Valley graben on the west and by the Railroad Valley graben on the east. Rocks exposed in the range consist of Paleozoic (505 to 245 million years before present (Ma)) sedimentary strata and Tertiary (26.1 to 3.8 Ma) tuff and basalts (see Geologic Time Chart). The study area contains only Tertiary rocks.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 73,200 acres that constitute the balance. A detailed geochemical and geophysical exploration program in the southern 2 mi2 of the WSA could reveal a drilling target for a large tonnage, low grade gold deposit.

References:

Diggles, M.F., Saunders, J.A., Ponce, D.A., Rochette, E.A., and Neubert, J.T., 1986, Mineral resources of the South Reveille Wilderness Study Area, Nye County, Nevada: U.S. Geological Survey Bulletin 1731-C, 11 p.

Neubert, J.T., 1985, Mineral investigation of the South Reveille Wilderness Study Area, Nye County, Nevada: U. S. Bureau of Mines Open File Report

Mineral resources of the South Reveille Wilderness Study Area.

Explanation, mineral resources of the South Reveille Wilderness Study Area.

Name: Stillwater Range
Area number: NV-030-104
Size (acres): 94,607

Status of mineral surveys: This area was not studied by the U.S. Bureau of Mines or the U.S. Geological Survey.

Identified mineral resources (known): No mineral resources have been identified within the Wilderness Study Area. The WSA includes a number of previously active mining districts (see Mining Activity section below).

Mineral resource potential (undiscovered): This area has high potential for sediment-hosted gold deposits in Triassic shales near Fondaway Canyon; moderate potential for epithermal gold-silver veins of the Comstock-type (quartz-adularia) on the northeast side of the area near the Dixie-Comstock mine; moderate potential for copper skarn mineralization near White Cloud Canyon; moderate potential for tungsten mineralization (disseminated scheelite in marble) near Fondaway Canyon; low potential for simple antimony deposits in the Fondaway Canyon area; low potential for platinum-group elements associated with gabbroic rocks of the Humboldt Lopolith; low potential for replacement iron deposits in Jurassic volcanic rocks associated with the Humboldt Lopolith; low potential for copper-nickel veins and replacement mineralization in the Humboldt Lopolith; high potential for geothermal energy along the range front on the east side of the area (western edge of Dixie Valley); low or no potential for oil and gas resources; and low potential for industrial materials due to the distance from inhabited areas and lack of known occurrences of industrial materials.

Mining activity: The White Cloud (or Coppereid) mining district is located in White Cloud Canyon, on the northeastern portion of the WSA. In the late 1800s, a mill in the district processed ore containing 26 percent copper in addition to small amounts of gold and silver, which was produced from local surface workings (Great Basin GEM Joint Venture, 1983, p. 14). There is nearly one square mile of patented claims in the White Cloud mining district.

The Dixie Comstock mine, in the northeastern portion of the WSA, was the major property in the Dixie Valley mining district. It produced some $150,000 worth of gold and silver in the late 1930s (Vanderburg, 1940, p. 48). There are a number of patented claims southwest of the Dixie Valley district.

The Quick-Tung mine is in the Shady Run mining district, on the western side of the study area. It produced tungsten in 1960 from several short adits and shallow shafts (Lawrence, 1963, p. 37). Total production at the Quick-Tung has been 10,000 units of WO3 (Willden and Speed, 1974). A gold heap leach operation is currently under way in Fondaway Canyon (Higgins, 1988).

The Cox Canyon district, on the southern border of the WSA, has produced minor amounts of gold from quartz veins in slate (Great Basin GEM Joint Venture, 1983, p. 33).

The IXL district, about one mile outside the southern boundary of the WSA, has produced a total of about $20,000 in precious metals from epithermal veins (Great Basin GEM Joint Venture). According to U.S. Bureau of Mines Mineral Production Records, the Creore mine, about two miles south of the WSA, in the IXL mining district, produced a total of 12 tons of ore in 1953 and 1955. From this ore, 81 oz of silver, 560 lb of copper, 2,172 lb of lead, and 134 lb of zinc were recovered.

The Copper Kettle district, on the northern boundary, has been explored for iron.

The Rosebud prospect, located in the northernmost portion of the study area, has reportedly produced a small amount of mercury, probably 10 flasks or less which was used for retort testing (Benson, 1956, p. 36).

The Revenue Group, located in the southwestern portion of the area, produced 1,900 tons of 73 percent fluorspar in 1942 and 1952-57 (Great Basin GEM Joint Venture, 1983, p. 24; Willden and Speed, 1974, p. 50).

There are many claims and blocks of claims in and around all of them, over 1000 claims in all (BLM records, July 1989). About 35 percent of the WSA is claimed or leased for minerals. There are also some 11,000 acres of geothermal leases and 18,000 acres of oil and gas leases.

Geology: The southwestern part of this area is underlain by Triassic mudstone, siltstone, and limestone. These rocks are intruded by several small Tertiary granitic plutons, mainly between White Cloud and Fondaway Canyons.The northeast part of the area consists of mafic volcanic rocks and gabbroic rocks of the Jurassic Humboldt Lopolith. The Triassic and Jurassic rocks are overlain and faulted against middle Tertiary volcanic rocks, primarily Oligocene and Miocene ash-flow tuffs and Miocene basalts, and minor amounts of Miocene sedimentary rocks. These Tertiary age rocks cover most of the central part of the area. The area is bounded on its east side by the Dixie Valley fault, which was last active in 1954.

Recommendations: A large variety of mineral deposits occur along the edges of this area and may extend into the area. Evaluation of mineral resource potential requires additional geologic mapping, geochemical sampling, and geophysical studies to determine if these deposit types occur within the study area. This Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

Benson, W. T., 1956, Investigation of mercury deposits in Nevada and in Malheur County, Oregon: U. S. Bureau of Mines Report of Investigations 5285, 54 p.

Great Basin GEM Joint Venture, 1983, Stillwater Range G-E-M Resources Area (GRA No. NV-04) Technical Report (WSA's NV 030-104 and 030-127): under contract YA-554-RFP2-1054, Reno, Nevada, 44 p.

Higgins, L. R., Earnest, D. F., and Cox, A. D., 1988, Nevada BLM Wilderness Study Areas mineral potential handbook: Nevada Mining Association, Reno, Nevada, 257 p.

Lawrence, E. F., 1963, Antimony deposits of Nevada: Nevada Bureau of Mines and Geology Bulletin 61, 248 p.

Matson, E. J., 1949, Investigation of the Table Mountain copper deposit, Churchill County, Nev.: U. S. Bureau of Mines Report of Investigation 4617, 6 p.

Page, B. M., 1965, Preliminary geologic map of a part of the Stillwater Range, Churchill County, Nevada: Nevada Bureau of Mines and Geology, Map 28, scale 1:125,000.

Papke, K. G., 1979, Fluorspar in Nevada: Nevada Bureau of Mines and Geology Bulletin 93, 77 p.

Ransome, F. L., 1909, Notes on some mining districts in Humboldt County, Nevada: U. S. Geological Survey Bulletin 414, 75 p.

Shawe, F. R., Reeves, R. G., and Kral, V. E., 1962, Iron ore deposits of Nevada, Part C. Iron ore deposits of northern Nevada: Nevada Bureau of Mines Bulletin 53-C, 130 p.

Sidder, G. B., 1987, A report on work in progress for the Reno 1° x 2° CUSMAP project, Nevada with additional bibliography: U. S. Geological Survey Open-File Report 87-656, 22 p.

U.S. Bureau of Mines, 1965, Mercury potential of the United States: U. S. Bureau of Mines Information Circular 8252, 376 p.

Vanderburg, W. O., 1940, Reconnaissance of mining districts in Churchill County, Nev.: U. S. Bureau of Mines Information Circular 7093, 57 p.

White, D. E., and Williams, D. L., 1975, Assessment of geothermal resources of the United States - 1975: U. S. Geological Survey Circular 726, 155 p.

Willden, Ronald, and Speed, R. C., 1974, Geology and mineral deposits of Churchill County, Nevada: Nevada Bureau of Mines and Geology Bulletin 83, 95 p.

EXPLANATION

Mineral resources of the Stillwater Range Wilderness Study Area.

Name: Table Mountain
Area number: NV-040-197
Size (acres): 35,958

Status of mineral surveys: This area has not been studied by the U.S. Bureau of Mines or the U.S. Geological Survey.

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): The mineral resource potential is largely unknown. The presence of calderas, caldera-fill sequences, and post-caldera silicic domes and intrusive rocks, a geologic setting similar to that in the Atlanta district, 4 miles to the north, suggests that a moderate resource potential for epithermal precious metal deposits (gold and silver) and volcanogenic uranium resources may be present. The is low potential for hot springs manganese resources similar to those at the Lucky prospect, and low potential for perlite and diatomite. Geology similar to that in the Parsnip Peak (040-206) Wilderness Study Area to the south suggests that low potential for arsenic, antimony, and mercury may also be present.

Mining activity: The Atlanta mining district extends into the northern part of the WSA. Brecciated volcanic rocks host jasperoid-associated silver-gold mineralization.

July 1989 BLM records show four active mining claims in the WSA. The Sand Spring geothermal prospect occurs in the southern part of the area.

Geology: The geology consists of a complex stratigraphic sequence of mid-Tertiary intermediate and silicic ash-flow tuff, lava flows and associated caldera-fill deposits. The structural margin of the Mount Wilson caldera cuts through the area. Post-caldera rhyolite domes and associated intrusive rocks are common in the southern part of the area.

Recommendations: Because so little is know about the resource potential of the area, and since the geology suggests that mineral resources may exist, this area should be studied as part of a comprehensive mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines.

References

Best, M.G., Christiansen, E.H., and Blank, R.H., 1989, Oligocene caldera complex and calc-alkaline tuffs and lavas of the Indian Peak volcanic field, Nevada and Utah: Geological Society of America Bulletin, v. 101, no. 8, p. 1076–1090.

Cox, J. W., 1981, Geology and mineralization of the Atlantic district, Lincoln County, Nevada: Reno, Nevada, University of Nevada, MS thesis, 83 p.

Garside, L. J., and Schilling J. H., 1979, Thermal waters of Nevada: Nevada Bureau of Mines and Geology Bulletin 91, p. 46.

Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: Reno, Nevada, unnumbered pages.

Toth, M.I., Stoneman, R.G., Blank, H.R., Jr., and Gese, D.D., 1986, Mineral resources of the White Rock Range Wilderness Study Area, Lincoln County, Nevada, and Beaver and Iron Counties, Utah, Chapter B: U.S. Geological Survey Bulletin 1728-B, 14 p.

Toth, M.I., Stoneman, R.G., Blank, H.R., Jr., and Gese, D.D., 1987, Mineral resources of the Parsnip Peak Wilderness Study Area, Lincoln County, Nevada, Chapter D: U.S. Geological Survey Bulletin 1728-D, 13 p.

Tschanz, C.M., and Pampeyan, E.H., 1970, Geology and mineral deposits of Lincoln County, Nevada: Nevada Bureau of Mines and Geology Bulletin 73, 187 p.

Willis, J.B., Best, M.G., Kowallis, B.J., and Best, V.C., 1987, Preliminary geologic map of northern Wilson Creek Range, Lincoln County, Nevada: U.S. Geological Survey Miscellaneous Field Studies Map MF-1971, scale 1:50,000.

EXPLANATION

Mineral resources of the Table Mountain Wilderness Study Area.

Name: The Wall
Area number: NV-060-163
Size (acres): 38,000

Status of mineral surveys: The entire study area was studied by the U.S. Geological Survey and the U.S. Bureau of Mines (Diggles and others, 1986)

Identified mineral resources (known): No metallic mineral oil and gas resources were identified. Basalt and cinders in the Lunar Crater Volcanic Field are sources of crushed stone.

Mineral resource potential (undiscovered): The Wall Wilderness Study Area has low mineral resource potential for gold, silver, copper, lead, and manganese associated with caldera collapse. There is no evidence to indicate that alteration or mineralization of older collapse structures in the study area has taken place. This geologic environment is permissive for epithermal gold-silver-copper-lead-manganese mineralization similar to that occassionally associated with caldera fracture systems elsewhere in Nevada. However, McKee (1979) points out that such mineralization is usually the result of later hydrothermal-fluid circulation taking place along the pre-existing structure. There is low potential for oil and gas resources.

Mining activity: No mining claims are present and no evidence of mining activity or prospecting was observed in the study area.

Geology: Silicic volcanic rocks of Tertiary age, basaltic flows of Tertiary and Quaternary age, and sediments of Tertiary and Quaternary age are the dominant stratigraphic units of The Wall Wilderness Study Area. The oldest rocks in the study area are 27 to 7 Ma (Ekren and others, 1971) and comprise thick sequences of felsic ash-flow tuffs. These are overlain by basaltic flows of the Lunar Crater volcanic field that range in age from 3.8 to 0.13 Ma (Turrin and others, 1985). About one third of the study area is covered with alluvium and colluvium deposits on pediment surfaces and with valley-fill, lake, and landslide deposits. These are two inferred caldera boundaries within and near the wilderness study area: the Pancake Range/Williams Ridge-Hot Creek Valley caldera boundary (Ekren and others, 1976), which lies outside of and encircles the wilderness study area; and the more striking structure known as The Wall, which Scott(1969) mapped as the edge of the Lunar Lake caldera.

Recommendations: No further work is needed.

References:

Diggles, M.F., Nash, J. Thomas, Ponce, D.A., Donald Plouff, and Kness, R.F., 1986, Mineral resources of the Palisade Mesa and The Wall Wilderness Study Areas, Nye County, Nevada: U.S. Geological Survey Bulletin 1731-B, p. B1-B12.

Ekren, E.B., Anderson, R.E., Rogers, C.L., and Noble, D.C., 1971, Geology of Northern Nellis Air Force Base Bombing and Gunnery Range, Nye County, Nevada: U.S. Geological Survey Professional Paper 651, 91 p.

Ekren, E.B., Bucknam, R.C., Carr, W.J., Dixon, G.L., and Quinlivan, W.D., 1976, East-trending structural lineaments in central Nevada: U.S. Geological Survey Professional Paper 986, 16 p.

Ekren, E.B., Rogers, C.L., and Dixon, G.L, 1973, Geologic and Bouguer gravity map of the Reveille Quadrangle, Nye County, Nevada: U.S. Geological Survey Miscellaneous Geologic Investigations Map I-806, scale 1:48,000.

Kness, R.F., 1985, Mineral investigation of Palisade Mesa and The Wall Wilderness Study Areas, Nye County, Nevada: U.S. Bureau of Mines Open-File Report MLA 26-85, 27 p.

McKee, E.H.; 1979, Ash-flow sheets and calderas: their genetic relationship to ore deposits in Nevada, in Chapin, C.E., and Elston, W.E., eds., Ash-flow tuffs: Seological Survey America Special Paper 180, p. 205-211.

Scott, D.H., 1969, Geology of the southern Pancake Range and Lunar Crater volcanic field, Nye County, Nevada: unpublished Ph.D. thesis, University California-Los Angeles, 128 p.

Scott, D.H., and Trask, N.J., 1971, Geology of the Lunar Crater volcanic field, Nye County, Nevada: U.S. Geological Survey Professional Paper 599-I, 22 p.

Snyder, R.P., Ekren, E.B., and Dixon, G.L., 1972, Geologic map of the Lunar Crater quadrangle, Nye County, Nevada: U.S. Geological Survey Miscellaneous Geologic Investigation Map I-700, scale 1:48,000.

Turrin, B.D., Renne, P.R., and Dohrenwend, J.C., 1985, Temporal trends in the chemical evolution of megacryst-bearing, subalkaline-alkaline basaltic lavas from the Lunar Crater volcanic field, Nye County, Nevada: [abs] Geological Society of America Abstracts with Programs, v. 17, n. 6, p. 14.

Mineral resources of The Wall Wilderness Study Area.

Explanation, mineral resources of The Wall Wilderness Study Area.

Name: Tobin Range
Area number: NV-020-406Q
Size (acres): 13,107

Status of mineral surveys: This area was not studied by the U.S. Bureau of Mines or the U.S. Geological Survey.

Identified mineral resources (known): The only identified mineral resources in or immediately adjacent to the study area are mercury and sand and gravel. Sand and gravel resources are suitable for local consumption.

Within the area are known occurrences of mercury, molybdenum, fluorine, tungsten, barite, and zinc.

Mineral resource potential (undiscovered): The study area has low potential for undiscovered mineral resources of gold, silver, molybdenum, mercury, tungsten, barite, fluorite, and zeolite.

Mining activity: An unknown quantity of mercury was produced from ore mined at the Last Chance Mine in the central part of the area. Immediately adjacent to but outside the area boundary to the south are several mines that reportedly have limited production of mercury, barite, fluorite, and zeolite. These mines are in the Mount Tobin Mining District (see BLM map).

July 1989 BLM records show 37 mining claims in or immediately adjacent to the WSA. Eighteen claims are in the central part of the area, Sec 14, 15, 22, and 23 of T. 29 N., R. 39 E; eight are in the northwestern part of the area; and the other 11 claims are in the southeastern part of the area. No major exploration activity is known.

Geology: Most of the study area is underlain by upper Paleozoic and Triassic sedimentary and metamorphic rocks that consist of chert, argillite, shale, greenstone, and minor amounts of siltstone, sandstone, conglomerate, and limestone. In the north and southern parts of the study area, these rocks are overlain by lower Triassic silicic and intermediate flows and Tertiary andesite flows and flow breccias. Several northeast- and northwest-trending faults cut the study area.

Recommendations: This Wilderness Study Area should be studied as part of a comprehensive mineral survey by the U.S. Bureau of Mines and the U.S. Geological Survey.

References:

Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas; Mineral potential handbook: Nevada Mining Association, Reno, NV, unnumbered pages.

Vanderburg W.O., 1936, Reconnaissance of mining districts in Pershing County, Nevada: U.S. Bureau of Mines Information Circular 6902, 57 p.

EXPLANATION

Mineral resources of the Tobin Range Wilderness Study Area.

Name: Tunnel Spring (Cougar Canyon)

Area number: NV-050-166/UT-060-123

Size (acres): 15,968 acres (5,400 acres in Nev., 10,568 acres in Utah) of which 6,919 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Conrad and others, 1990).

Identified mineral resources (known): No mineral resources have been identified in the Wilderness Study Area.

Mineral resource potential (undiscovered): The geologic environment is permissive for small deposits of a number of base- and precious-metals, including gold, silver, copper, lead, zinc, mercury, and molybdenum, but to date there is no indication that any of these commodities are present in appreciable amounts in the study area (Tschanz and Pampeyan, 1970; Conrad and others, 1990). Minor hydrothermal alteration, present several miles south of the study area, and locally abundant faulting that would provide pathways for metal-bearing hydrothermal fluids, suggest that there is low potential for gold, silver, copper, and mercury in the study area. There is low potential for zeolite and perlite resources as well as cinders and building stone, but the area is located far from major markets. There is no potential for oil and gas.

Mining activity: No mining districts, or mines are known in the WSA. The Acoma perlite prospect lies 2 miles west of the area and the Sunnybrook gold prospect lies 2 miles south. The Orma-Valoy silver claims (nos.1-32) are within the WSA. Oil and gas leases blanket 15,730 acres of the WSA. A sample from the westernmost prospect pit near the southern boundary of the WSA, in Utah, contained 0.002 oz/ton gold.

Geology: The study area is located on the Nevada-Utah border adjacent to Beaver Dam State Park in Nevada and Pine Park State Park in Utah. Slightly to moderately tilted volcanic rocks of Miocene age, related to the nearby Caliente caldera complex (Noble and McKee, 1972; Ekren and others, 1977) are exposed in the area.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 9,049 acres that constitute the balance.

References:

Cook, E.F., 1960, Geologic map of Washington County, Utah, (1:125,000), supplement to the geologic atlas of Utah, Washington County: Utah Geological and Mineralogical Survey Bulletin 70, 119 p.

Ekren, E.B., Orkild, P.P., Sargent, K.A., and Dixon, G.L., 1977, Geologic map of Tertiary rocks, Lincoln County, Nevada: U.S. Geological Survey Miscellaneous Investigations Map I-1041, scale 1:250,000.

Molenaar, C.M., and Sandberg, C.A., 1983, Petroleum potential of wilderness lands in Utah, *in* Petroleum potential of wilderness lands in the western United States: U.S. Geological Survey Circular 902 A-P, p. K1-K14.

Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: Reno, Nevada, unnumbered pages.

Noble, D.C., and McKee, E.H., 1972, Description and K-Ar ages of volcanic rocks of the Caliente volcanic field, Lincoln County, Nevada, and Washington County, Utah: Isochron/West, no. 5, p. 17-24.

Oakes, Ed, Wedow, Helmuth, Poling, Robert, and Voelker, Al, 1981, The Depart- ment of Energy's energy-resource evaluation of wilderness study areas administered by the Bureau of Land Management, Cedar City district, Utah: Prepared for; Leasing Policy Development Office, Department of Energy, 317 p.

Ryan, G.S., 1989, Mineral investigation of a part of the Cougar Canyon Wilderness Study Area (UT-040-123/NV-050-166), Washington County, Utah and Lincoln County, Nevada: U.S. Bureau of Mines Open-File Report MLA 21-89.

Tschanz, C.M., and Pampeyan, E.H., 1970, Geology and mineral resources of Lincoln County, Nevada: Nevada Bureau of Mines and Geology Bulletin 73, 183 p.

EXPLANATION

Mineral resources of the Tunnel Spring (Cougar Canyon) Wilderness Study Area.

Name:	Twin Peaks
Area number:	CA-020-619A
Size (acres):	90,345 of which 54,970 were studied at the request of the U.S. Bureau of Land Management.
Status of mineral surveys:	Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Vercoutere and others, 1988).
Identified mineral resources (known):	The wilderness study area contains at least 30 million tons of subeconomic pozzolan resources and low-grade occurrences of gold, silver, copper, lead, zinc, nickel, molybdenum, zeolites, and clay.
Mineral resource potential (undiscovered):	The study area has a moderate mineral resource potential for gold in hydrothermally brecciated basalt that is situated south of Mixie Flat in the north-central part of the study area. The entire study area has low mineral resource potential for copper, tungsten, and zinc.
Mining activity:	The wilderness study area is not in a mining district nor has any mining activity been recorded. Nearby, about 30 mining claims were staked in 1911 and 1930 for an unknown commodity and two claims for diatomaceous silica; evaporites have been mined on a small scale. There are no current mining claims in the wilderness study area according to October, 1988, U.S. Bureau of Land Management records.
Geology:	The study area lies in the southeastern part of the Modoc Plateau physiographic province. It is underlain by Tertiary and Quaternary rocks that are either directly or indirectly volcanic in origin. They consist predominantly of basaltic ans silicic flows, with mafic and intermediate dikes and plugs, and lenses of volcaniclastic sedimentary rocks intercalated within the basalt. Quaternary rocks are predominantly alluvial and lacustrine sedimentary deposits. An areally restricted stack of basalt of Pliocene to Pleistocene age is present in the western part of the study area.
Recommendations:	As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 35,375 acres that constitute the balance. A detailed study of structures and altered rock in areas showing low-grade metal occurrences is recommended.
References:	Bonham, H.F., and Papke, K.G., 1969, Geology and mineral deposits of Washoe and Storey Counties, Nevada: Nevada Bureau of Mines Bulletin 70, 136 p.

Gay, T.E., Jr., 1966, Economic mineral deposits of the Cascade Range, Modoc Plateau, and Great Basin region of northeastern California, *in* Bailey, E.H., ed., 1966, Geology of northern California: California Division of Mines and Geology Bulletin 190, p. 97-104.

Miller, M.S., 1987, Mineral resources of the Twin Peaks study area, Lassen County, California, and Washoe County, Nevada: U.S. Bureau of Mines Open-File Report MLA 15-87, 31 p.

Qualheim, B., 1979, Hydrogeochemical and stream sediment reconnaissance report for the Lovelock 1° x 2° NTMS quadrangle, Nevada: Lawrence Livermore Laboratory, University of California, Report UCRL 52677, U.S. Department of Energy contract number W-7405-ENG-48, GJBX-90-79, 16 p. with 37 p. of appendixes.

Vercoutere, T.L., Sorensen, M.L., Frisken, J.G., Plouff, Donald, and Miller, M. S., 1988, Mineral resources of the Twin Peaks Wilderness Study Area, Washoe County, Nevada, and Lassen County, California: U.S. Geological Survey Bulletin 1706-A, 13 p.

Mineral resources of the Twin Peaks Wilderness Study Area

Name: Virgin Mountain
Area number: NV-000-ISA1
Size (acres): 30,000

Status of mineral surveys: This area has been studied as part of mineral surveys by the U.S. Bureau of Mines and U.S. Geological Survey (Hose and others, 1981).

Identified mineral resources (known): Known mineral occurrences include copper-, nickel-, palladium-, and platinum-bearing mafic and ultramafic dikes both within the northern half of the WSA and immediately to the north (Bancroft, 1910). Known resources occur at the Key West and Great Eastern Mines (Allsman, 1934; Needham, 1950). At least 140,000 tons of indicated and inferred tungsten resources occur at the Walker mine. Copper, lead, and zinc minerals occur at the Ranch View prospect in the southeastern corner of the WSA. However, inaccessible workings preclude resource definition. Known non-metallic resources include feldspar (in pegmatite dikes); extensive gypsum deposits; limestone; mica and beryl at and near the Walker property (Holmes, 1964). Extensive salt deposits occur to the west of the Virgin Mountains, in the Virgin River Valley and were mined in the 1860's.

Mineral resource potential (undiscovered): The Virgin Mountains Instant Study Area has moderate potential for gold, silver, tungsten, copper, and nickel, in Precambrian rocks exposed in the northeastern and northwestern parts of the area. Low potential exists in these areas for associated cobalt, palladium and platinum. Scattered lead, copper, zinc, and molybdenum anomalies throughout the area indicate low potential for these metals. There is moderate potential for gypsum, beryllium, mica, and feldspar and low potential for building stone, uranium, geothermal energy, and oil and gas.

Mining activity: The WSA includes the southern part of the Bunkerville or Copper King mining district which has lode and placer (Johnson, 1973) gold, silver, platinum, palladium, nickel, tungsten, base metals, and sheet mica production. Other prospects contain fluorite and uranium. Nickel was known as early as 1901, the Key West property was worked about 1903 and platinum was known to be an ore constituent as early as 1906 (Lincoln, 1923, p. 18). The WSA contains at least 12 mines and prospects, and two mines (Key West and Great Eastern) within one mile of the north boundary (Hose and others, 1981).

District production through 1962 includes at least 55 oz. of gold, 1347 oz silver, 10 oz platinum, 177 oz palladium, about 130,000 lbs copper, 26,597 lbs lead, approximately 1900 lbs nickel, about 3000 lbs of tungsten trioxide, and minor amounts of cobalt. This production has occurred from both within the WSA, the Key West Mine (Allsman, 1938), 1/2 mile north of the WSA, and the Great Eastern Mine 1 1/2 miles north of the WSA. Within the study area at least 3000 lbs of tungsten trioxide were produced from the Walker mine; and over 2000 lbs of sheet mica have been produced from the Mica Queen. Mica and beryl occurrences in pegmatites in the northeastern portion of the WSA have been prospected.

Industrial minerals within the WSA include 100 ft thick beds of gypsum, limestone, sandstone, and sand and gravel.

There is also reconnaissance exploration by at least 15 mining companies. Six companies (AMSELCO, Arizona Juneau Resources, Fischer Watt Gold Co., Inspiration Development Co., Intermountain Exploration, and Sierra Exploration, Inc.) hold lode mining claims in or near the WSA. Current exploration activity is focused on evaluating platinum bearing copper-nickel occurrences. These occurrences are associated with ultramafic dikes and sills in the northwest quarter of the WSA and immediately north of the WSA, near the Key West and Great Eastern mines. Within the last five years, at least 20 diamond drill holes have been drilled to evaluate this area.

July 1989 BLM records show mining activity within the WSA includes at least 200 lode claims. Oil and gas leases cover or have covered up to 2/3 of the WSA. Petroleum exploration in and north of the WSA includes geologic and seismic evaluations in 1979.

Geology: Mafic and ultramafic dikes are spatially associated with copper-nickel-platinum occurrences and ore bodies within Paleozoic sediments. Pegmatites contain significant beryl and sheet mica. The southern part of the WSA is covered by Mesozoic and Tertiary rocks which are uncut by mafic and ultramafic dikes, but may hide other platinum-nickel-cobalt bearing mafic and ultramafic dikes.

Recommendations: Delineate tungsten resources at the Walker mine, determine the extent of cobalt-nickel-platinum-palladium resources near and in the WSA, evaluate all industrial minerals within the WSA.

References:

Allsman, P. T., 1938, Cost of mining 55 tons of copper-nickel ore at the Great Eastern prospect, Bunkerville, Clark County, Nev.: U.S. Bureau of Mines Information Circular I.C. 7029, 9 p.

Bancroft Howland, 1910, Platinum in southeastern Nevada: U.S. Geological Survey Bulletin 430, p. 192-199.

Beal, L.H., 1965, Geology and mineral deposits of the Bunkerville District, Clark County, Nevada: Nevada Bureau of Mines Bulletin 63, 96 p.

Holmes, G.H., 1964, Investigation of beryllium deposits in the northern Virgin Mountains of Clark County, Nev., and Mohave County, Ariz.: U.S. Bureau of Mines Report of Investigations 6572, 30 p.

Hose, R.K., Carlson, R.R., Federspiel, F.E., and Huffsmith, J.D., 1981, Mineral resource potential of the Virgin Mountains Instant Study Area, Clark County, Nevada: U.S. Geological Survey Map MF 1204-B, scale 1:62,500

Johnson, M. G., 1976, Placer gold deposits of Nevada: U.S. Geological Survey Bulletin 1356, 118 p.

Knopf, Adolph, 1915, A gold-platinum-palladium lode in southern Nevada: U.S. Geological Survey Bulletin 620-A, p. 1-18.

Lincoln, F. C., 1923, Mining districts and mineral resources of Nevada: Nevada Bureau of Mines and Geology, Nevada Newsletter Publishing Company, Reno, Nevada, 296 p.

Longwell, C.R., Pampeyan, E.H., Bowyer, Ben, Roberts, R.J., 1965, Geology and mineral deposits of Clark County, Nevada: Nevada Bureau of Mines, Bulletin 62, 218 p.

Needham, A. B., Soule, J. H., and Trengove, R. R., 1950, Investigation of the Great Eastern Deposit, Clark County, Nev.: U.S. Bureau of Mines Report of Investigation 4679, 5 p.

Pierce, W. H., 1980, Pennsylvanian and Lower Permian stratigraphy and history of part of the Virgin Mountains area, northwest Arizona and southeast Nevada: Doctoral Dissertation, Colorado School of Mines, 394 p.

EXPLANATION

Mineral resources of the Virgin Mountain Wilderness Study Area.

Name:	Wall Canyon
Area number:	CA-020-805
Size (acres):	45,790
Status of mineral surveys:	This area was not studied by the U.S. Geological Survey or the U.S. Bureau of Mines.
Identified mineral resources (known):	There are no known mineral deposits in the wilderness study area.
Mineral resource potential (undiscovered):	The study area has moderate mineral resource potential for gold, silver, and mercury associated with faults and felsic intensive rocks; moderate mineral resource potential for zeolites and moderate mineral resource potential for uranium, and lithium associated with the rhyolitic flows and ash-flow tuffs. Volcanic-derived sediments and lake deposits have moderate mineral resource potential for clay, zeolites, and pozzolan.
Mining activity:	The wilderness study area is not in a mining district, and has had no known mineral production. However, U.S. Bureau of Land Management records, October 25, 1988, indicate that an area straddling the northwestern border of the wilderness study area contains at least 41 current claims, some of which are wholly or partially within the wilderness study area. The claims include the MC group (18 claims) in T. 39 N., R. 18 E., secs. 1 and T. 39 N., R. 19 E., sec. 6 owned by Tenneco; the West Aspen group (14 claims) in T. 39 N., R. 19 E., sec. 9 owned by W. Wright Parks III (Geologist, Reno, NV). Horizon Gold Shares apparently has consolidated most or all of the claims and has leased them to U.S. Borax Chemical Co., which is exploring the area for a hot springs-type gold deposit similar to the Hog Ranch mine, about 25 miles east. The Hog Ranch mine, which began production in 1986, is the first major gold mine in Washoe County, and its discovery has led to intense exploration by numerous individuals and companies in the region including the wilderness study area for similar deposits. There are no geothermal resources or sand and gravel nor are there any oil or gas leases in the wilderness study area.
Geology:	Bedrock geology in the study area is dominantly volcanic, consisting of extensive basalt, andesite, and dacite flows, breccias, and intrusive phases, and rhyolitic flows and ash-flow tuffs. Minor volcanic derived sediments and lake deposits also occur in the area. Many north and northwest trending faults cut the south and west portion of the study area. Sediments are known to contain abundant vertebrate and plant fossils of Barstovian age.

Recommendations: The wilderness study area may host all or portions of one or more deposits of gold and other metals of high value. The wilderness study area should be studied as part of a comprehensive mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines. Future work in the study area, in the form of geologic mapping, detailed geochemical sampling and radiometric measurements is necessary to accurately assess the potential for hot springs-type gold, silver, and mercury mineralization associated with rhyolitic rocks, and potential for clay, zeolite, and pozzolan resources.

References:

Barringer Resources, Inc., 1982, Geochemical and geostatistical evaluation of wilderness study areas, Winnemucca district, northwest Nevada, 5 v.: Golden, Colo. (available from NTIS, U.S. Department of Commerce, Springfield, VA 22161,or call Information Center and Bookstore (202) 377-0365).

Bonham, H.F., 1969, Geology and mineral deposits of Washoe and Story Counties, Nevada, *with a section on* Industrial mineral deposits by K.G. Papke: Nevada Bureau of Mines and Geology Bulletin 70, 140 p.

Nevada Mining Association Bulletin, 1986, Western goldfield principals visit Hog Ranch project: v. 10, No. 6, 5 p.

Muffler, L.J.P., ed., Assessment of geothermal resources of the United States-1978: U.S. Geological Survey Circular 790, 163p.

Sandberg, C.A., 1983, Petroleum potential of wilderness lands in Nevada, *in* Miller, B.M., ed., Petroleum potential of wilderness lands in the western United States: U.S. Geological Circular 902-A-P, p. H1-H11.

Turrin, B.D. Bergquist, J.R., Turner, R.L., and Plouff, Donald, 1988, Mineral Resources of the High Rock Canyon Wilderness Study Area, Washoe County, Nevada: U.S. Geological Survey Bulletin 1707-D, 14 p.

U.S. Bureau of Land Management, 1988, Geographic index (of) all claims.

U.S. Bureau of Mines, 1989, Mineral Industry Location System (MILS).

EXPLANATION

M/B Geologic terrane having moderate mineral resource potential for gold, silver, mercury, zeolites uranium, lithium clay, zeolites, and pozzolan with certainty level B

Mineral resources of the Wall Canyon Wilderness Study Area.

Name: Weepah Spring
Area number: NV-040-246
Size (acres): 61,137 of which 50,499 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (du Bray and others, 1987).

Identified mineral resources (known): Gold, silver, copper, mercury, and uranium occur within and near the wilderness study area. A small tonnage (3,300 short tons) silver resource with an average grade of 2.13 oz silver per ton was identified on the FNB mining claims within the northeastern part of the study area. Mercury was produced from the Red Head mining claims, within and adjacent to the study area, in the 1940's and 1950's. No resource could be delineated from available information. A jasperoid breccia and the adjacent Pilot Shale contain gold and/or silver and anomalously high amounts of arsenic, antimony, and mercury along the northwestern boundary. The geochemistry, host rocks, and alternation in this part of the study area are similar to those at the Alligator Ridge deposit, White Pine County, Nevada. The anomalously high arsenic, antimony, and mercury indicate an exploration target for a large-tonnage, low-grade disseminated gold/silver deposit within and to the west of the study area.

Mineral resource potential (undiscovered): The mineral resource potential for metals in the study area is high in the northwestern part, where undiscovered deposits of disseminated gold and associated mercury may exist; moderate in two small areas in the eastern and southern parts, where epithermal vein deposits of gold, silver, copper, lead, and zinc may exist; and low for all metals in most of the study area (fig. 1). The resource potential for oil and gas, coal, uranium, and geothermal energy is low. The mineral resource potential for commodities with industrial applicatons is moderate in those parts of the study area underlain by surficial deposits and carbonate rock.

Mining activity: As of June 1984, mining activity within the WSA had consisted of claim staking, trenching, and drilling within and adjacent to the northwestern and western WSA boundaried. Most of the area west and northwest of the study area is covered by mining claims. Since the late 1960's, Bear Creek Mining Company, the exploration subsidiary of Kennecott Corporation, has mapped, sampled, and drilled in the Timber Mountain Pass area.

Geology: The Seaman Range is underlain by carbonate sedimentary rocks of Silurian through Mississippian age and by Tertiary volcanic rocks (see geologic time chart at end of report). The former occur throughout the northeastern part of the study area and the latter throughout the southwestern part. Surficial deposits are extensive in the southern part. Volcanic and sedimentary strata are locally offset along high-angle faults that are abundant in the area.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 10,638 acres that constitute the balance. Additional geologic mapping, bulk sampling, and drilling in the northwestern part of the study would be needed to identify a gold/silver deposit.

References:

Du Bray, E.A., Blank, H.R., Jr., Turner R.L., Gese D.D., and Harris, A.D., 1987, Mineral resources of the Weepah Spring Wilderness Study Area, Lincoln and Nye Counties, Nevada: U.S. Geological Survey Bulletin 1728-E, 11 p.

Gese, D.D., 1988, Trace element distribution near jasperoids in the Weepah Spring Wilderness Study Area, Lincoln and Nye Counties, Nevada: U.S. Bureau of Mines Open-File Report OFR 12-88, 45 p.

Gese, D.D., and Harris, A.D., 1985, Mineral resources of the Weepah Spring Wilderness StudyArea (NV-040-246), Nye and Lincoln Counties, Nevada: U.S. Bureau of Mines Open-File Report MLA 40-85, 52 p.

Mineral resources of the Weepah Spring Wilderness Study Area.

References:

Gese, D.D., 1985, Mineral resources of the White Rock Range Wilderness Study Area, Lincoln County, Nevada, and Beaver and Iron Counties, Utah: U.S. Bureau of Mines Open-File Report MLA 31-85, 12 p.

Toth, M.I., Stoneman, R.J., Blank, H.R., Jr., and Gese, D.D., 1986, Mineral resources of the White Rock Range Wilderness Study Area, Lincoln County, Nevada, and Beaver and Iron Counties, Utah: U.S. Geological Survey Bulletin 1728-B, 14 p.

Name:	White Rock Range
Area number:	NV-040-202/UT-040-216
Size (acres):	23,625
Status of mineral surveys:	This wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Toth and others, 1986).
Identified mineral resources (known):	No mineral resources are identified in the wilderness study area.
Mineral resource potential (undiscovered):	The White Rock Range Wilderness Study Area has low mineral resource potential for metals; the potential for oil and gas, coal, and geothermal energy is also low.
Mining activity:	As of July 1984, no mining activity had taken place within the study area. Small gold-and silver-bearing breccia veins along faults in rhyolite are exposed in workings about 500 ft east of the study area, but are not known to occur in the WSA. Approximately 1 mi south gold and silver in large shear zones in the volcanic rocks were being recovered at a small cyanide heap-leach operation.
Geology:	The White Rock Range Wilderness Study Area is along the eastern margin of the Basin and Range Province and is also within the Blue Ribbon lineament, a major east-trending structural zone in southern Nevada and Utah. In the study area and vicinity, widespread silicic volcanic rocks of Oligocene age unconformably overlie eroded remnants of deformed Paleozoic and Mesozoic sedimentary rocks; the northern end of the study area lies along the northeastern margin of the Wilson caldera. The study area contains a thick section of Oligocene volcanic rocks, flanked on the west by Tertiary lake sediments; extensive colluvial deposits are developed along the western and eastern sides. The volcanic rocks in the study area consist of the Lund Formation of the Needles Range Group, the tuff of Ripgut Springs, the Isom Formation, the Bauers Tuff Member of the Condor Canyon Formation, and tuff and rhyolite flows of the Blawn Formation. A veneer of andesite overlies the volcanic rocks near White Rock Peak, and rhyolite flows crop out just to the east of the study area. Many northeast- and northwest-trending faults crossing the area have offet from a few feet to more than several hundred feet; abundant springs commonly occur along the faults or at the intersection of faults.
Recommendations:	No further work is recommended.

Explanation, mineral resources of the Weepah Spring Wilderness Study Area.

EXPLANATION

Mineral resources of the White Rock Range Wilderness Study Area.

Name: Worthington Mountains

Area number: NV-040-242

Size (acres): 47,633 of which 26,587 were studied at the request of the U.S. Bureau of Land Management.

Status of mineral surveys: Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (du Bray and others, 1986).

Identified mineral resources (known): A silver-zinc-lead-copper resource of 825,000 short tons at a grade of 2.91 oz of silver per ton, 7.4 percent zinc, 1.95 percent lead, and 0.99 percent copper is present at the Smelter Shaft. Limestone suitable for agricultural uses (greater than 85 percent $CaCO3$), high purity quartzite (99 percent $SiO2$), and sand and gravel are present in the WSA, but are available closer to market areas.

Mineral resource potential (undiscovered): Metallic-mineral (gold, silver, copper, lead, zinc, tungsten) resource potential within the study area is moderate in the northernmost part, and it is low in the remainder of the area. Energy resources are unknown; accordingly, their resource potential is considered low.

Mining activity: The Freiberg mining district, at the northern end of the WSA, had production of 274 oz gold, 2,359 oz silver, 12,600 pounds lead, and 7,600 pounds zinc. Diamond core drilling was to be conducted by a claim owner near the northern border of the WSA in the fall of 1983, at the time of the field examination. According to the BLM, there is a pending (Sept. 1989) application to drill an area just north of the Smelter Shaft.

Geology: The Worthington Mountains are underlain by carbonate sedimentary rocks of Ordovician through Pennsylvanian age (see geologic time chart on last page of this report). A small amount of monzogranite crops out near the northern part of the map area, and Tertiary volcanic rocks crop out in the northwestern and southeastern corners of the map area. The most notable geologic structure in the area is the Freiberg thrust fault, along which are juxtaposed an allochthonous block of Ordovician Pogonip Group limestone and Ordovician Eureka Quartzite, and younger, upper Paleozoic dolomitic rocks.

Recommendations: As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 21,046 acres that constitute the balance. Drilling and metallurgical testing is required to further evaluate the Smelter Shaft.

References:

Du Bray, E.A., Blank, H.R., Jr., and Wood R.H., II, 1986, Mineral resources, geology, and geophysics of the Worthington Mountains Wilderness Study Area, Lincoln County, Nevada: U.S. Geological Survey Bulletin 1728-A, 11 p.

Great Basin G-E-M Joint Venture, 1983, Worthington Mountains G-E-M resource area technical report: prepared for the Bureau of Land Management under contract No. YA-554-RFP2-1054, 31 p.

Tschanz, C.M., and Pampeyan, E.H., 1970 Geology and mineral deposits of Lincoln County, Nevada: Nevada Bureau of Mines Bulletin 73, 187 p.

Wood, R.H. II, 1985, Mineral resources of the Worthington Mountains wilderness study area (BLM NV-040-242), Lincoln County, Nevada: U.S. Bureau of Mines Open-File Report MLA 69-85, 47 p.

Mineral resources of the Worthington Mountains Wilderness Study Area.

Explanation, mineral resources of the Worthington Mountains Wilderness Study Area.

Name:	Yellow Rock Canyon (Little High Rock Canyon)
Area number:	CA-020-913/NV-020-008
Size (acres):	52,143 of which 17,320 were studied at the request of the U.S. Bureau of Land Management.
Status of mineral surveys:	Only part of this wilderness study area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines (Keith and others, 1987).
Identified mineral resources (known):	No mineral resources have been identified in the Wilderness Study Area (WSA), but 2 million tons of subeconomic perlite, and over 28 million tons of subeconomic pozzolanic sediments occur within and adjacent to the WSA.
Mineral resource potential (undiscovered):	The results of studies suggest three areas with moderate resource potential for gold and silver in epithermal deposits in the northwestern, central, and southern parts of the area. Elsewhere within the study area, the potential for these resources is low. Two small areas in the southeastern part of the study area have low potential for uranium resources; one small area has low potential for pozzolan resources, and one area has low potential for perlite resources. Potential for geothermal resources is low in the entire study ares.
Mining activity:	The Hog Ranch gold mine lies southwest of the WSA and the Jabo epithermal gold prospect is within WSA. There are between 500 and 750 active claims in or near the WSA. The claims extend from the Hog Ranch mine, southwest of the WSA, or are part of the Jabo prospect in the south central part of the WSA.
Geology:	The study area is underlain by a sequence of lava flows and pyroclastic deposits that overlie and interfinger with lake and stream sediments; all are of Miocene age. These volcanic and sedimentary rocks are faulted and locally altered.
Recommendations:	As only part of this area has been studied as part of a mineral survey by the U.S. Geological Survey and the U.S. Bureau of Mines, further work is needed to assess the 34,823 acres that constitute the balance. The structural lineament hosting the gold extends into the wilderness study area. A comprehensive study of this structure is recommended.
References:	Bonham, J. F., 1969, Geology and mineral deposits of Washoe and Storey Counties, Nevada, with a section on industrial mineral deposits by K. G. Papke: Nevada Bureau of Mines and Geology Bulletin 70, 140 p.

Connors, R. A., Robinson, M. L., Bukofski, J. F., Meyer, W. T., and Howarth, R. J., 1982, Geochemical and geostatistical evaluation (of) wilderness study areas, Winnemucca district, northwest Nevada: prepared under contract YA-553-CT1-1096 for the U.S. Bureau of land Management by Barringer Resources, Inc., v. 1-5, 72 p.

Keith, W. J., Turner, R. L., Plouff, Donald, and Peters, T. J., 1987, Mineral resources of the Little High Rock Canyon Wilderness Study Area, Humboldt and Washoe Counties, Nevada: U.S. Geological Survey Bulletin 1707-C, 17 p.

Nevada Mining Association, 1988, Nevada BLM Wilderness Study Areas, Mineral Potential Handbook: Reno, Nevada, unnumbered pages.

Peters, T. J., Munts, S. R., and Miller, M. S., 1987, Mineral resources of the Little High Rock Canyon study area, Humboldt and Washoe Counties, Nevada: U.S. Bureau of Mines Open-File Report MLA 16-87, 39 p.

U. S. Bureau of Land Management, 1984, Eagle Lake/Cedarville study areas Draft Environmental Impact Statement: U.S. Bureau of Land Management, Susanville (CA) District Office, 340 p.

Mineral resources of the Yellow Rock Canyon Wilderness Study Area.

Explanation, mineral resources of the Yellow Rock Canyon Wilderness Study Area.